



**The Smokeless Powders of Laflin & Rand and their
Fate 100 Years after Assimilation by DuPont**

By Klaus Neuschaefer

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To all the powdermen and women who helped build and defend our great country.



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1898 Brochure

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Hagley Museum & Library www.hagley.org
Wilmington, DE 19807-0630

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Jefferson County Colorado Public Library

E-Bay!

Cautionary Note:

The author does not recommend nor even suggest that anyone load or shoot any of the old powders under discussion, should any be found. These old powders may have suffered deterioration over the century since they were made, which could make their performance erratic, unpredictable, and dangerous. Any old powders that appear to have a reddish dust or an acrid acidic odor should be immediately disposed of in a safe manner, as recommended by SAAMI. (Sporting Arms and Ammunition Manufacturers Institute)

More Information:

Even as this research draws to a close, as it at some point must, some information about these products remains elusive. Anyone who has information about these products is encouraged to contact the author at klausn@qadas.com to make the information more complete.

How do you tell when something is done just right? Longevity is one way, maybe the only way, ultimately. When something has been around a long time, the originators must have done something right in its creation. It doesn't need change or embellishment. Indeed, any such change is often regarded as "adulteration". It is as good and as useful today as the day it was created, and everyone recognizes it. It becomes over time a "classic". Beethoven's 5th symphony is like that. Well, nearly all of his symphonies are. Gershwin's Rhapsody in Blue is like that. Our inspired American Constitution is like that.

Twenty odd years ago, when I began to shoot the "classic" Colt model 1911 .45, I asked about what powders to use when reloading for it. You can probably tell me the names that came up. Bullseye, Unique, 231, 700X, and maybe one or two others. Classics. If you look at reloading the 12 gauge shotgun, invariably one of those same names comes up. It turns out that Unique is just that in that it is useful for a lot of different applications, from shotgun to pistol to even some very light specialty rifle loads. OK, it isn't perfect for everything. It is messy (at least until the latest reformulation by Alliant in 2001), but Unique has been around for a very long time.

1898 was the year when the Laflin & Rand Company introduced their Shotgun Smokeless Powder to the world. It was an enormous step forward from black powder. (Talk about messy!) It was powerful. You only needed about half as much, compared to black powder, and it was even waterproof, according to their advertisements. Not a bad thing in a duck blind. It was one of the first American smokeless powders to be made available to the public. That same year, the powder was improved, and the name was changed to Infallible because it was just that. That name stuck even as the company that produced it changed from Laflin & Rand to DuPont in 1907 and from DuPont to Hercules in 1912. Hercules continued to make Infallible in canister grade until 1937 for consumers, and well beyond that for ammunition manufacturers. Hercules changed the name of the powder to Unique, the name we know today. Here, then, is the *rest of the story*.

A word about markets for these products seems in order. When we think of gunpowder, both black and smokeless, we most naturally think of guns and of the military uses that these products have been put to over the centuries. While that line of thought is certainly reasonable, the vast majority of explosives have been put to use in mining of all manner of useful products, from coal to iron and copper ore and in stone quarries. They have also been put to extensive use in road building, railroading, and canal construction.¹ For example, some 61 million pounds of dynamite were used in the construction of the Panama Canal.² Of the more than 134 explosives-related patents issued in the United States between 1890 and 1915, at least 74 were for "industrial" purposes. It can be said that only in our modern, more "civilized" times, have we seen these most useful materials put to the most savage and cowardly acts of terrorism. In days gone by, it was unthinkable that anyone would misuse these obviously dangerous materials. Indeed, it was not unusual for *youngsters* to safely use gunpowder for hunting or work on the farm.

Until the American Civil War, all users of firearms were reloaders since all firearms were muzzleloaders. The introduction during the Civil War of the first commercially viable breech loading cartridge rifles was certainly not the end of reloading. Indeed, the ability to re-use the brass cartridge case was an important goal of the industry. It is no wonder then that ability of the consumer to re-load was always a natural part of the powder maker's market.

Synopsis:

Irish immigrant Matthew Laflin began a saltpeter refinery in Southwick, Massachusetts and provided saltpeter for the making of gunpowder to the Massachusetts militia during the revolutionary war. He began manufacturing black powder before 1800, making the Laflin Company one of America's earliest explosives manufacturers, even before DuPont. In 1810, when Matthew Laflin died, his heirs unified the various Laflin powder companies, expanded the family business into Orange County, New York, and ultimately incorporated as the Laflin Powder Company in 1866. In 1869, the Laflin and the Smith & Rand powder companies merged to become the Laflin & Rand Powder Company. They manufactured a variety of black powders for industrial blasting, the military, and sporting use in firearms. In 1872 Laflin & Rand, DuPont, and Hazard powder companies formed the Gunpowder Trade Association, or GTA, as equal partners, to control powder prices. The Powder Trust was eminently successful in controlling the explosives market for the next 30 years, despite passage of the Sherman Anti-Trust Act in 1890.

Laflin & Rand became interested in smokeless powders in the early 1890s, but did not bring out any of their own until fairly late due to safety and quality concerns. There was a certain reticence on the part of many of the established black powder manufacturers to tackle the dangers of making and handling nitrocellulose and nitroglycerin that are the primary constituents of smokeless powder.¹ When Laflin & Rand finally did bring out their smokeless powders, they were a great success, and were marketed as high quality "upscale" products to prosperous sportsmen and women. They also produced quite a number of purely military smokeless propellants for Army and Navy cannons. W-A .30 was used by the government in the first military cartridge designed for smokeless powder, the 30-40 Krag. Bullseye became *the* powder for use in the army's new .45 caliber pistol. They also introduced a number of other rifle, shotgun, and pistol powders, including a variety of non-canister specialty powders for ammunition makers. Infallible and Bullseye were immediately popular with sportsmen and are still manufactured today as Unique and Bullseye by Alliant.

1902 was a pivotal year for Laflin & Rand. New ownership at DuPont brought a renewed vigor and desire for growth to DuPont. That growth began with the purchase of Laflin & Rand in the fall of 1902. Laflin & Rand continued to be operated as a subsidiary until 1907. DuPont went on to purchase 108 powder firms in the next few years. This and their participation in the Powder Trust caused the government to break up DuPont in 1912. The break up did allow DuPont to keep their single-base military propellants, some explosives, and other chemicals while Atlas Powder Company received some of the high explosives, and Hercules received the Laflin & Rand smokeless and black powders.

If it seems that the history of this industry, these companies, and the manufacture of these materials is a bit jumbled, your perceptions are correct. Hopefully, this story can be presented in a reasonably complete and coherent manner. Some understanding of the materials themselves is as good a place to start as any.

Materials:

Black Powder (BP) has its first references in China in the 9th century with the first military use in the 11th century. Consisting of 75% potassium nitrate (saltpeter), 15% softwood charcoal, and 10% sulfur in an “intimate” mixture, it is pressed, corned, and milled to various granulations. Black powder is known for being relatively inefficient since less than half the original mass converts to gas. It is also known for copious acrid sulfurous white smoke and corrosive fouling. This was the only known explosive and propellant until the middle 1800s. For that reason, no discussion of explosives is complete without reference to black powder. Certainly, by the time of the Civil War, black powder was well understood. So long as it was dry and in the proper granulation, it would work well for blasting or as a propellant in firearms, pretty much regardless of which company manufactured it. The various companies would naturally try to distinguish their powder as somehow better than the competition, but there was little actual difference. (One advertisement says its product was triple refined. Another says its was not heavily glazed. One famous powder was made with charcoal made partially from peas instead of willow wood alone. Of course some companies did in fact have a closer eye on quality control, with DuPont, Hazard, and Laflin & Rand leading the pack.) Among the stipulations of the Gunpowder Trade Association regarding quotas was that a company exceeding its sales quota was to buy the additional powder from the other members of the association.¹ As early as 1850, DuPont and Laflin had agreements to provide powder for one another to accommodate shipping difficulties, such as when the river would freeze over in winter.

Nitrocellulose (NC) was invented by Schoenbein in 1845; he called it “Schiessbaumwolle”. We know it as guncotton or pyroxyline.² It was patented in Great Britain, Patent 11407 of 1846 for Schoenbein by Taylor.³ Nitrocellulose can be made in a wide range of nitration levels. Between 10.9% and 11.7% nitration is used for lacquers and coatings, while 11.8% to 12.1% is used for lacquers, cements, and adhesives. Typically, propellants have a 12.5% to 13.25% nitrogen saturation. The manufacture of nitrocellulose was and is a completely foreign process to that of traditional black powder. Real understanding of its actual working occurred much later, and even the level of nitration was in dispute for many years because of the difficulty of analysis. That very minute quantities of impurities left in the cellulose were the cause of several disasters was not fully grasped until after the turn of the century. Left un-treated, nitrocellulose would also tend to slowly decompose all by itself over time. This decomposition would accelerate as it progressed, ultimately with the possibility of spontaneous ignition, if in sufficient quantity.⁴ Wood fibers or cotton or even corn pith could be used to make nitrocellulose, but cotton became the favorite because of availability and ease of purification, among other reasons.

Some countries banned the manufacture of nitrocellulose for a time, after explosions that killed workers and destroyed factories. Whole new manufacturing methods were required, and the materials used were not so simply handled as the sulfur, saltpeter, and charcoal used to make black powder. Strong acids used in the manufacturing process were dangerous liquids, and the byproducts of manufacture were corrosive and poisonous. These byproducts were also valuable materials and ultimately required re-refinement and recycling.

Nitroglycerin (NG) or blasting oil or glycerol trinitrate - 18.5 % nitrogen - was invented by Sobrero in 1846 (Piroglycerina)¹ The first commercial production of nitroglycerin was by Nobel in 1862.² (British Patent 1813 of 1864)³ Nitroglycerin was and is finicky stuff. Sobrero was burned and injured by it. Nobel lost his younger brother to it. Lamot DuPont's most untimely demise was because of it. It caused fearsome headaches in those who handled it. Properly purifying it after manufacture was critical. As a liquid, it was prone to being spilled, usually with disastrous results. The manufacture and transport of nitroglycerin became universally restricted if not outright prohibited.⁴ When absorbed by nitrocellulose, however, nitroglycerin was found to add some unique and desirable properties to the nitrocellulose, such as water resistance in explosives and propellants. Here too, methods of manufacture were fraught with hazards, and byproducts had to be dealt with and recycled.

It is no wonder then, that many of the long time explosives manufacturers were hesitant to enter the new high explosives business. Because of the use of these two extraordinary materials, nitrocellulose and nitroglycerin, in the manufacture of smokeless powders, smokeless powders are inextricably linked to high explosives. Whole new areas of chemistry were offshoots of these products, most notable of which are plastics, dyes, paints, and even medicines.

This combination of fractiousness and utility is what led Nobel to find a way to stabilize nitroglycerin and make a better, safer way to handle it. By absorbing nitroglycerin in a kind of clay, kieselguhr, the potential of high explosives was realized in Nobel's invention which he called Dynamite. (British Patent 1345 of 1867)⁵ Three or more times the energy of black powder made dynamite a product in demand.

While all shooters in the 1890s and early 1900s were completely familiar with black powder, good attributes and bad, they were all also becoming increasingly aware of and familiar with smokeless powder. As a completely new and different product, shooters needed exposure to it and its particular attributes as well as education as to its proper use. Since smokeless powder was so much more powerful than black powder, this education had significant safety implications, particularly with older firearms that were made for black powder. The additional power, cleanliness, and other attributes, such as water resistance, certainly made smokeless powder an attractive product. Smokeless powders for use in shotguns began in Europe with Schultze (made from wood pulp and really only semi-smokeless) in 1862, continued with Volkmann in 1870, and with EC (made from cotton) in England in 1882. These early powders were "bulk" powders, measured to the same volume as black powder, and not by weight, like the "dense" smokeless powders created later.

Poudre B (Boulangier or Blanc) was the first smokeless rifle powder (made from cotton) by Vieille in 1884. This was a “single-base” (NC only) powder developed for the French military 8mm Lebel rifle. (1886 – 1918) Poudre B was later found to have very serious deterioration problems, resulting in the loss of 2 ships in 1907 and 1911.^{1,2}

Ballistite was introduced by Nobel in 1887, which was collodion (completely dissolved NC made from cotton) and NG and camphor – British Patent 1471 of 1888³, U.S. Patent 456508 of 1891. Cordite was introduced in 1889 by Dewar and Abel for the British government, and consisted of NC and NG and petroleum jelly (U.S. Patent 409549 of 1889). There was a patent infringement suit filed by Nobel against Dewar, Abel, and the British government for the similarity of Cordite to Ballistite that was held to be without merit by the British courts.

The first American smokeless powder manufacturer was the American EC & Schultze Powder Company of Oakland, New Jersey in 1890. Schultze powder (for shotguns) was a single base powder made from wood, U.S. Patent 38789 of 1863.⁴ This company was one of the many acquired by DuPont and transferred to Laflin & Rand, and then to Hercules in 1912. Among the first smokeless powders produced by DuPont were Shotgun Smokeless in 1894, DuPont #1 (bulk) Rifle Smokeless, and Lesmok, a semi smokeless powder.

With some notable exceptions, attempting to ascribe any certain development, product, or improvement to any one company or individual seems to be a largely irrelevant exercise in this field because many of these innovations occurred in parallel by various persons; and whether in collaboration or competition, these developments built upon one another in rapid succession. The issues are also confused by the many acquisitions, mergers, and technology transfers within the industry.⁵ Many of these products were not originally patented, with the developers relying on secrecy to maintain their product superiority.⁶

Since the number of differing materials in the final product is so small, primarily nitrocellulose (NC) and nitroglycerin (NG), the real issues are a matter of process (how it is made) and final form or shape (strings, tubes, flakes, spheres), size, perforations, and coatings.

What is clear is that a number of persons in the United States had an interest in the development and production of explosives and propellants, and a great many of the facilities and companies they created ultimately coalesced under the name DuPont, which was then broken up by the anti-trust actions of the early 1900s. Even with the divestitures, plant management remained largely unchanged, and the new directors came directly from the best of DuPont’s senior managers.^{7,8} Actually, the vast majority of explosive and propellant manufacturers before 1907 really had only three fates: dissolution by catastrophic accident, elimination by competition, or assimilation by DuPont.⁹

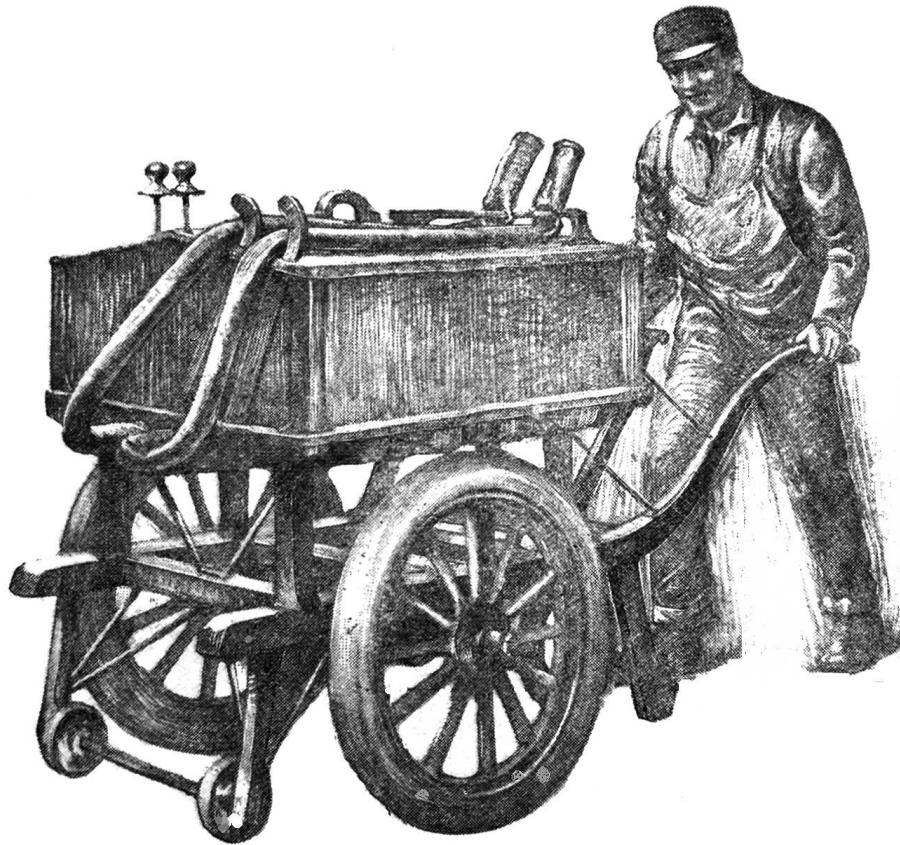
Any discussion of this industry must include some background on the DuPont Company. DuPont began manufacturing black powder in 1802 at Brandywine Mills, near Wilmington, Delaware, and discontinued it in 1971.¹ The black powder mills on the Brandywine sustained one last accident in 1921, and the original mills were closed that year. By then, DuPont had quite a number of other, newer plants scattered around the country. Black powder was the only product of the DuPont Company until 1880. DuPont entered the smokeless powder business in 1892, with their Carney's Point, New Jersey plant. DuPont did not enter into the high explosives, or dynamite business directly until the acquisition of Laflin & Rand in October of 1902,² even though they had an interest in several other high explosives manufacturers since before 1880 (California Powder Works and Lake Superior Powder Company). It was with great misgiving, if not dismay on the part of uncle Henry du Pont, that Lamont du Pont formed the Repauno Chemical Company in 1880 with partners Laflin & Rand and DuPont to manufacture dynamite.^{3,4}

While DuPont management was a harder than nails, even ruthless competitor, it was pretty reasonable with worker needs, unlike some of the other industrialist families of the era. Already in 1813, the firm implemented an employee savings plan. On March 19, 1818, 36 men were killed and 4 more mortally wounded in an accident that set off 85000 pounds of powder and wrecked the upper yards (Eleutherian Mills). The families of these men were pensioned by the company.⁵ Later, great efforts were made to specially compensate people who made particular contributions to the company. T. Coleman du Pont's company stock was acquired by DuPont, in part to give to Messrs. Brown, Haskell, Ramsey, Coyne, Tallman, and Laffey in 1915.⁶ These men were all instrumental in the consolidation and transformation of DuPont into the "big company" it became in the twentieth century.

Labor relations with management seem to have been pretty good throughout DuPont's history, with the only exceptions in 1889, when new efficiency measures irked some workers, and later in the early 1900s during their great expansion, when some of their acquisitions were union shops. du Pont family members certainly had little affinity for unionism.⁷ It would seem that from the very outset, the du Pont family was influenced by the age of the French Enlightenment, treating workers with an uncommon respect and paying workers sufficiently that the frugal worker could save enough to get ahead and buy land of his own.⁸ The fact that du Pont family members worked, and sometimes died, side by side with the regular workers doubtless contributed to these mostly good relations.



It is striking that so many men went into the powder business, both black powder and its more powerful successors. Each day, day after day, they went down to the yards to make powder. It was a hard, heavy, and dirty business for the most part. Quantities of materials had to be transported to, from, and around the mills, largely by hand. Later, hazardous chemicals, such as concentrated acids, and volatile solvents were routinely handled in great quantities. These men relied upon one another for their very lives since one single careless or thoughtless act could kill everyone in an explosion. Despite enormous effort and great creativity, the business is fraught with danger, and the history is a litany of disasters large and small. (Of course, none of them were small for the killed, or maimed, or their families.) There are few businesses where the workers are so reliant on others for their continued survival. A great deal of respect is due to anyone who is or ever was a powderman.



1920s “Angel Buggy” used to transport nitroglycerin in the powder yard

Angel buggies similar to the one pictured above continue to be used today to transport nitroglycerin in the powder yards. Weighing in at well over 200 pounds empty, some can hold over 1000 pounds of nitroglycerin. Contemplating any small misstep with one certainly brings the meaning of the name into sharp focus.

The Laflin & Rand “flag in wreath” logo had been in use since January of 1896 and became a registered trademark in April 1902 (Registered Trademark #38137). The logo includes a laurel wreath with berries and ribbon, an eagle with up-lifted wings on the upper left, and a 3-striped flag in the middle with powder type (Orange Extra Sporting, Infallible Shotgun Smokeless, Bullseye Revolver Smokeless, etc.). The logo remained in use through the 1950’s by DuPont and then Hercules, typically to indicate Laflin & Rand heritage powders. (Notable exceptions include DuPont #1 Rifle Smokeless, DuPont 1909 Military Rifle Smokeless (#20), DuPont RSQ (pistol), DuPont Empire (shotgun), and DuPont Ballistite (shotgun), which carried the logo but were never Laflin & Rand products.)



It is also apparent that Laflin & Rand’s consumer products, both black powder and smokeless, were marketed to the “carriage trade” as better or “upscale” products. Their packaging and marketing materials were certainly more eye appealing and expensive to produce than those of other manufacturers, particularly after 1895. While most manufacturers, including DuPont, were content, for the most part, to use (very lovely) black and white engravings on their labels and promotional materials, Laflin & Rand used this color logo and created some extraordinary brochures with embossed covers and lavish use of color. Their consumer smokeless powder tins were colorfully painted or covered with brightly colored and expensively printed labels, all of which carried the flag in wreath logo, except Unique. (Many manufacturers, including Laflin & Rand and DuPont, did however produce especially beautiful annual wall calendars with artwork specifically commissioned from famous painters of the day.)

Born in Ireland in 1735, Matthew Laflin emigrated to America with his parents in 1740. He began refining potassium nitrate for the Massachusetts militia during the Revolutionary War, and later built a powder mill in Southwick, Massachusetts, where he began his very successful explosives business, even before DuPont.^{1,2} There is some evidence that he may have made powder for use during the Revolutionary War. He married Lucy Loomis of the later Hazard Powder Company Loomis family. After Matthew Laflin died in 1810, his descendants expanded the family business into New York, and incorporated the firm in 1866 as the Laflin Powder Company. They operated two mills in New York and one in Wisconsin.³ The Smith and Rand Company operated a powder mill in Kingston, New York and a mill three miles west of Newburgh, New York.⁴ A year later, in 1867, Albert Rand (1827-1874) of the competing Smith & Rand Powder Company (incorporated in December of 1864)⁵ proposed uniting the two firms, and in 1869 both sides agreed to merge into the Laflin & Rand Powder Company of New York, with Rand as the new firm's first president. The home office was located in Esopus, New York, about half way between Saugerties and Newburgh, New York, and some ninety miles north of New York City, on the Hudson River.⁶ Laflin & Rand was regarded as the second largest powder maker in the United States in 1900.⁷

The Laflin & Rand Powder Company was DuPont's leading post-Civil War competitor in the explosives industry, and also an important equal partner in the Gunpowder Trade Association (GTA). In April, 1872, Laflin & Rand collaborated with friendly rival DuPont, the Hazard Powder Company, Oriental Powder Mills, Austin Powder Company, Miami (Xenia) Powder Company, and American Powder Company to establish the GTA, a trust comprising the nation's top explosives manufacturers, that sought to regulate the powder industry with price controls, protected territories, and sales quotas.^{8,9} (It should be noted that DuPont secretly bought the Hazard Powder Company in 1876 after the death of Colonel Hazard in 1868, a devastating accident in 1871, and an economic downturn (panic) in 1873.^{10,11,12} The Hazard Company was operated as a wholly owned subsidiary of DuPont until the consolidation that began in 1902. This secret was very carefully kept for at least the next ten years and was not really public knowledge until after the turn of the century.) Among the stipulations of the Gunpowder Trade Association regarding quotas was that a company exceeding its sales quota was to buy the additional powder from the other members of the association, meaning Laflin & Rand, or DuPont, or Hazard.¹³ Trusts and combinations of this kind were not illegal until passage of the Sherman Anti-Trust Act of 1890, and not prosecuted until after 1900. The formation of the GTA was also during a general economic downturn that saw the government disposing of huge quantities of surplus powder left over from the Civil War. Laflin & Rand and DuPont also cooperated in the emerging high explosives, or dynamite field by jointly establishing the Repauno Chemical Company with Lammot du Pont in 1880, the Hercules Powder Company in 1882, and the Eastern Dynamite Company in 1895. This co-operation was not unusual since the two companies had collaborated since at least the early 1850s on such things as product shipping and even pricing.^{14,15} The du Ponts and Laflin & Rand management (Turcks) were actually close personal friends as well. The last Laflin left the company with the retirement in 1890 of Sylvester Laflin.¹⁶

The combined efforts of DuPont and Laflin & Rand at industry consolidation and control were so successful that by 1900, Laflin & Rand and DuPont together commanded over two-thirds of the entire explosives industry.¹ (Another source said 85% by 1881.) This percentage is pretty nebulous because of all the partnerships with other companies and other holdings, both secret and public. According to Stevens in his work of 1912, DuPont directly controlled or controlled through majority stock ownership, 100 % of explosives sales to the government, 64 % of sporting smokeless powders, 73.5 % of black sporting powder, 71.5 % of dynamite, 72 % of sodium nitrate blasting powder, and 64 % of black blasting powder sales in 1907 in the United States.²

Laflin & Rand entered the high explosives or dynamite market in 1878, with the acquisition of an interest in the Lake Superior Powder Company, which was already making dynamite. Laflin & Rand had sales rights for a time for Troisdorf-Rottweil smokeless powders from Europe, and were offered Nobel's Ballistite, which they declined on economic grounds in the early 1890s. 1892 saw the first DuPont smokeless powder plant in New Jersey across the river from Wilmington Delaware at Carney's Point. In 1898 Laflin & Rand acquired the American Smokeless Powder Company, in which they already had an interest. American Smokeless (the former Leonard Smokeless Powder Company, 1892-1894) of Pomton, New Jersey, had experienced repeated business difficulties; they were probably under-capitalized and poorly managed. The acquisition brought with it chemists Whistler & Aspinwall.³

While working for the Leonard Powder Company, and later the American Smokeless Company, Colonel Garland Whistler and Captain Henry Aspinwall 1859–1904 collaborated to create W-A .30 powder specifically for the first U.S. military cartridge intended for smokeless powder, the 30-40 Krag-Jorgenson, which was adopted by the government in 1892⁴ – U. S. Patents 541909-910-911 of 1895. Captain Aspinwall became the first superintendent of Laflin & Rand's smokeless powder plant at Pomton Lakes, New Jersey. Developmental testing of the 30-40 Krag cartridge was begun in 1890 with European powders (Wetteren) and continued with powders from Peyton (California Powder Works – in which DuPont had a 43% interest since 1876^{5,6}, and became a subsidiary as of 1903), and also a DuPont smokeless powder. Cartridge development encountered many delays from powder availability to primer problems, case corrosion, and bullet jacket issues.⁷ The first production cartridges for the new rifle were issued from Frankford arsenal in 1894 with 36 grains of DuPont powder and later with 42 grains of Laflin & Rand W-A .30 powder (1895), apparently both before and after Laflin & Rand had acquired the American Smokeless Powder Company.⁸ There was a consistency problem with this cartridge until the end of the century, largely because of bullet non-concentricity.⁹



Encrypted Powder Formulas

GOVERNMENT RIFLE POWDER W - A 72.
 -----:0:-----

HOKBHBBDGABRVBAZFCJZQISFLBXTOTHB
 GWBSBSBSCMTRGJIFICHWCZKSOJWGBRW
 VJKSEXOXJZSFVDGABRVPSXWIPBAZPOW
 SPOBSDBVUBSKODLDCXBVYDCWOKYWI
 BAZPOWSLNFSEMHMGPHHFKVCIQRMXS

SPORTING NO 1 W - A 80.

TGXHMSBSCMTRGQWLXCUMUKFWQTGXHMI
 CMXDCXBYUIQQGZHCQBATSDFRIFJGPD
 FAAAABLHJGHSVWPGBRRBWNOZIDGABRV
 DGZOGVWMSBWWFSZSCQSZGZTSCMTRI
 SS

SPORTING NO 2 W - A 85.

HOKBHBTAABSDFRIFJGBWHJUUBQWXWBE
 WXZMHKFWKOBGCFKVOTTHUIBGGYABQR
 HLUBHZZSDBSDFRIFJGPDFAAABLHJGHSQ
 WPKDCXBYVYDCWOKYWIIPBAZPOWSGTSVD
 ZXVCIQRMXS

CANNON W - A 76.

HZOPHBBDGABRVBAZFCJZQISFLBXTOTHB
 DGABRVUMTQCWHGTHSQDQABRVPSXWIP
 BAZPOWSWOUVWDGABRVYDGZOGVWMSBWW
 PSZSCQSSTRCQSIACFWJSJVCIQRKVSHU
 CDGHI PHZXSTISXHSUGHUIBGIJTO

THE AMERICAN SMOKELESS POWDER CO.,
 POMPTON LAKES,
 PASSAIC CO., NEW JERSEY.

W-A. Smokeless Powder

*Other part of this formula in
 L & R safe deposit box 4764*

Accession 500 Series 1 Box 540 (Formulas)

Laflin & Rand W-A powder formulas (1894-98) Vigenère Cipher OSGOOD=Key

Mr. James K. Osgood was president of the American Smokeless Powder Company from 1894 to 1898.

Government Rifle Powder W - A 72

H O K B H B D G A B R V B A Z F C J Z Q I S F L B X O T H B
 G W B S B S C M T R G J I F I C H W C F Z K S O J W G B R W
 V J K S E X O J Z S F V D G A B R V P S X W I P B A Z F O W
 B A Z F O W S L N F S H E M G F H H F K V C I Q R M X S O

Sporting No 1 W - A 80

T G X H M S C M T R G Q W L X C U O M U K F W Q T G X H M I
 C M X D C X B V Y U I Q Q G Z H C Q B A T S D R I F J G P D
 F A A A B L H J G H S V W P G B R R B W N O Z I D G A B R V
 D G Z O G V W M S B W W F S Z S C Q S Z G Z T S C M T R I U
 S S

Sporting No 2 W - A 85

H O K B H B T A B S D R I F J G B W H J U U Z B Q W X W B I
 W X Z M H K F W K O B G C F K V O O T H U I B G G Y A B Q R
 H L U B H Z S D B S D R I F J G P D F A A A B L H J G H S Q
 W F K D C X B V Y D C W O K Y W I P B A Z F O W S G T S V D
 Z X V C I Q R M X S O

Cannon W - A 76

H Z O F H B D G A B R V B A Z F C J Z Q I S F L B X O T H B
 D G A B R V U M T Q C W H G T H S Q D G A B R V P S X W I P
 B A Z F O W S W O U V W D G A B R V D G Z O G V W M S B W W
 F S Z S C Q S S T R C Q S I A O F W S J V C I Q R K V S H U
 C D G H I P H Z X S S T I S X H S U G H U I B G I J T O ¹

Government Rifle Powder W-A 72

t w e n t y p o u n d s n i t r o g l y c e r i n f i f t y
 s e v e n p o u n d s g u n c o t t o n t w e l v e a n d t
 h r e e q u a r t e r s p o u n d s b a r i u m n i t r a t
 n i t r a t e t h r e e q u a r t e r s p o u n d u r e a

Sporting #1 W-A 80

f o r t y p o u n d s n i t r o g l y c e r i n f o r t y f
 o u r p o u n d s g u n c o t t o n n i n e p o u n d s b a
 r i u m n i t r a t e s i x a n d o n e h a l f p o u n d s
 p o t a s s i u m n i t r a t e o n e h a l f p o u n d u r
 e a

Sporting #2 W-A 85

t w e n t y f i v e p o u n d s n t t r o g l y c e r i n f
 i f t y t h r e e a n d o n e h a l f p o u n d s g u n c o
 t t o n t w e l v e p o u n d s b a r i u m n i t r a t e n
 i n e p o u n d s p o t a s s i u m n i t r a t e o n e h a
 l f p o u n d u r e a

Cannon W-A 76

t h i r t y p o u n d s n i t r o g l y c e r i n f i f t y
 p o u n d s g u n c o t t o n t e n p o u n d s b a r i u m
 n i t r a t e e i g h t p o u n d s p o t a s s i u m n i t
 r a t e o n e a n d o n e q u a r t e r p o u n d s p e t r
 o l a t u m t h r e e q u a r t e r s p o u n d u r e a

Decrypted by Michael Fuhr, Denver, 2006

Hercules and the Laflin & Rand Heritage Powders

WHEN WE TALK ABOUT CONSISTENCY, WE
DON'T JUST MEAN FROM BATCH TO BATCH.
WE MEAN OVER A CENTURY OR SO.

This antique bottle of gun powder sits in the Ballistic Laboratory outside the office of our Chief Technical Information Representative at the Alliant Techsystems plant in Kenvil, New Jersey. The powder was manufactured at this same plant in 1899, when the company was known as Laflin & Rand Powder Company. That was thirteen years before it became the Hercules Powder Company, and 97 years before it became Alliant Powders.

This nearly-century-old, double-base gun powder is stored under distilled water to protect it from deterioration, because stabilizers for long-term storage were not introduced until about 1910.* Periodically, our ballistic



engineers dry a small amount and test fire it in a 12 gauge test load. Amazingly, it still performs almost to original specifications.

The jar of powder is there to remind us not only of the long and proud tradition of our company, but of the commitment we have to consistency. We never forget that reloaders must be able to count on consistent and repeatable performance from their powders—lot after lot, year after year. In an age of fads and constant change, when it comes to powder there's something to be said for the absolute, unchanging predictability of yesterday's—and today's propellants from Alliant.

**Do not store today's powders under water. Refer to SAAMI bulletin on the properties and storage of smokeless powders.*



Page from a 1996 Reloader's Guide, immediately after Hercules sold their smokeless powder business to Alliant

The Infallible/Unique powder in this jar was actually manufactured at Laflin & Rand's Pomton Lakes (Haskell, New Jersey) plant about 25 miles northeast of Kenvil, New Jersey. The jar still exists in 2007 and was moved to Alliant's New River plant in Radford, Virginia. Originally, there were two of these jars, but one of them has not been seen in many years.

The label on the front reads, “

Unique Smokeless Powder
This powder was placed in water on
June 26, 1899.
Renewed: August 13, 1917
August 6, 1981 ”

A lovely little 1898 embossed pamphlet with drawings of a well-dressed woman hunting by A.C. Baker of New York:



Ye smokeless powder for ye thoughtful sportsman.

The genius of invention has given to the sportsman a powder of the highest merit. Laflin and Rand Shotgun Smokeless

Laflin and Rand dense nitros. They give high velocity with close and regular pattern.

As a hammerless ejector is better than a flintlock, so is a dense powder more up-to-date than a bulk nitro.

Laflin and Rand

Laflin and Rand smokeless is cut into grains and not crushed. Every grain is of the same size and possesses the same strength.

Laflin and Rand Shotgun Smokeless will give you confidence in your ammunition and improve your shooting.

The game is not obscured nor the gun fouled in the burning of Laflin and Rand Shotgun Smokeless.

Correspondence with sportsmen is solicited by the Laflin and Rand Powder Company of New York.

New or old, wet or dry, in any climate, Laflin and Rand Shotgun Smokeless is always the same.

Is it waterproof? Soak Laflin and Rand smokeless powder overnight in water, dry it on a blotter and try it.

If your dealer does not keep Laflin and Rand Shotgun Smokeless, we will sell it to you direct.

Laflin and Rand Sporting Rifle Smokeless is a dense nitro powder for black powder rifles and for revolvers.

Laflin and Rand .30 caliber Smokeless is a modern rifle powder for high power rifles.

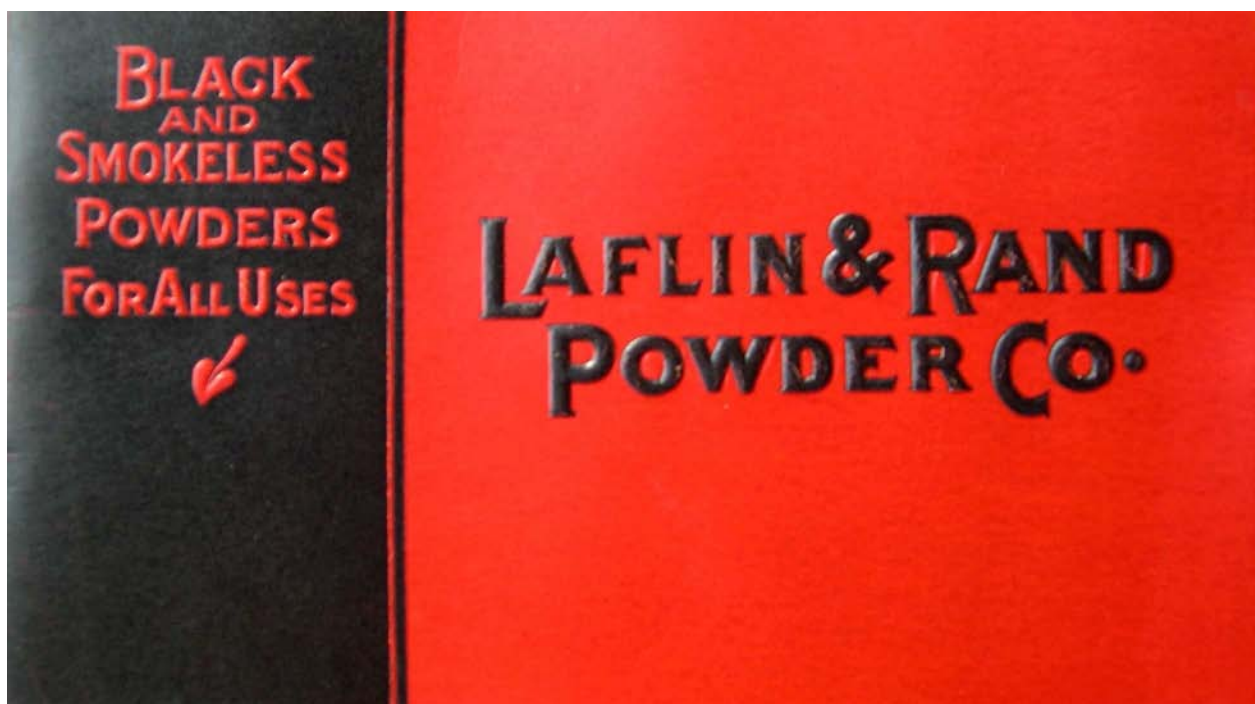
Prices for Laflin and Rand Shotgun Smokeless single can (8 ounces) \$ 1.00

10 can drum (3 pounds) \$ 9.00 Quarter-Keg (6 ¼ pounds) \$ 11.25 Half-Keg (12 ½ pounds) \$ 22.00

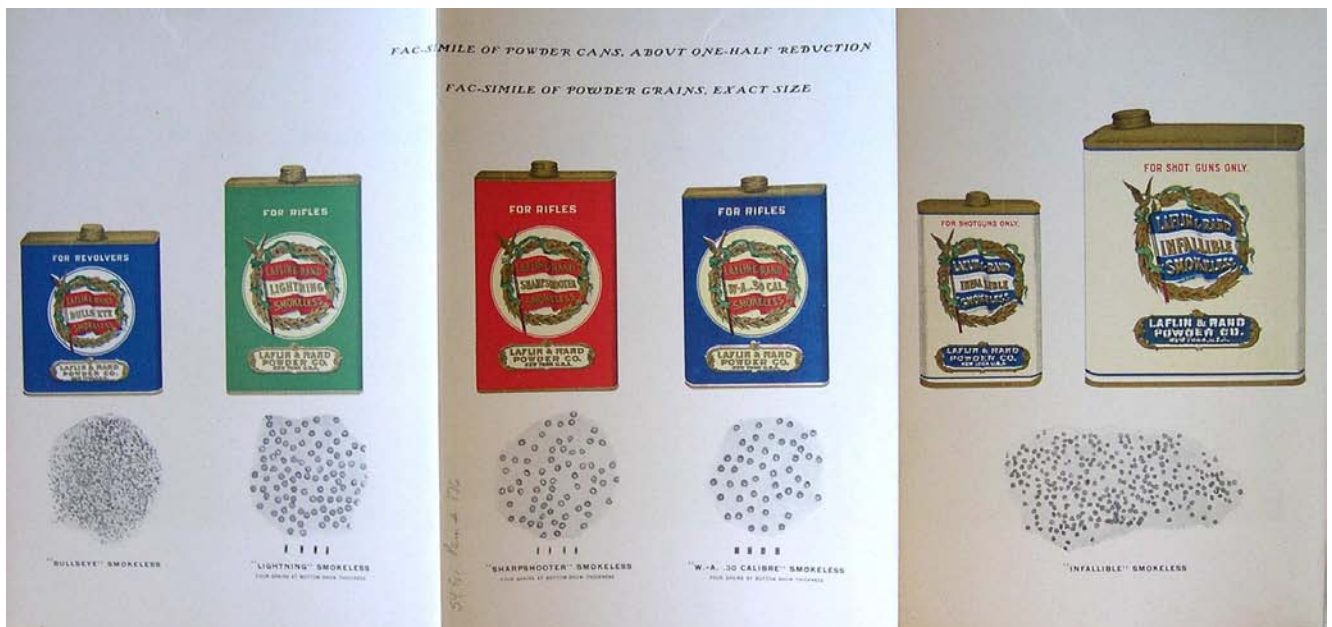
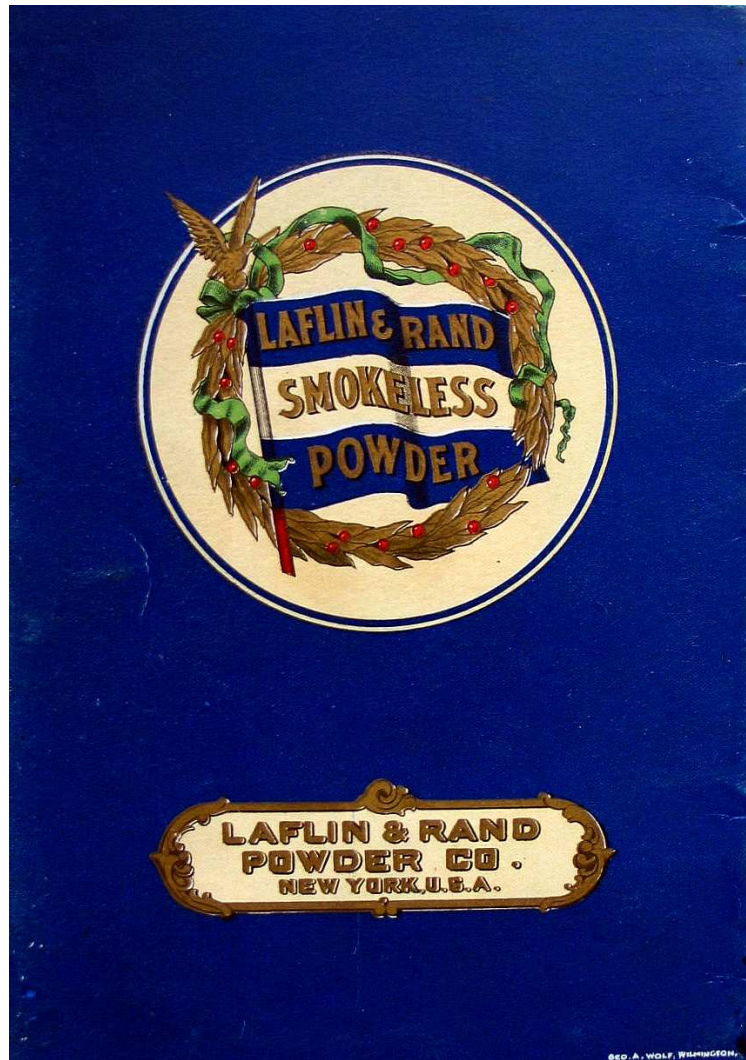
Keg (25 pounds) \$ 43.50 Write for discounts.

If you would enjoy your outing, take shells which bear the name of Laflin and Rand.

The end of the hunt.



A particularly lovely and detailed brochure from 1902





1899 Advertisement

Four Military Advertisement Counter Cards from 1901



Laflin & Rand Hunting Counter Cards from 1904



ASK FOR SHELLS LOADED WITH ORANGE EXTRA THEY ARE THE BEST.



LAFLIN & RAND
POWDER CO

WE have been making powder for years---Our reputation as a reliable, responsible company is well established. Therefore when we say that after exhaustive tests we have arrived at the conclusion that our powders are the best on the market, we mean it.       

For Shotguns... { "INFALLIBLE," a smokeless really smokeless.
"ORANGE EXTRA SPORTING," a black powder known the world over.

Write for folder called "Infallible Facts."

For Rifles..... { "W. A. 30 CALIBER," for all 30-40 rifles.
"LIGHTNING," for all other high-power rifles.
"SHARPSHOOTER," for black powder rifles, also for miniature charges for all high-power rifles.

For Automatic Pistols and Revolvers. { "BULLSEYE." After shooting it you will use no other.

Laflin & Rand Powder Co

NEW YORK - CHICAGO - DENVER - SAN FRANCISCO

LAFLIN & RAND WATERPROOF SHOTGUN SMOKELESS POWDER.

THIS POWDER IS NOT AFFECTED BY DAMPNES AND WILL KEEP FOR YEARS IN ANY CLIMATE WITHOUT LOSING ITS STRENGTH.

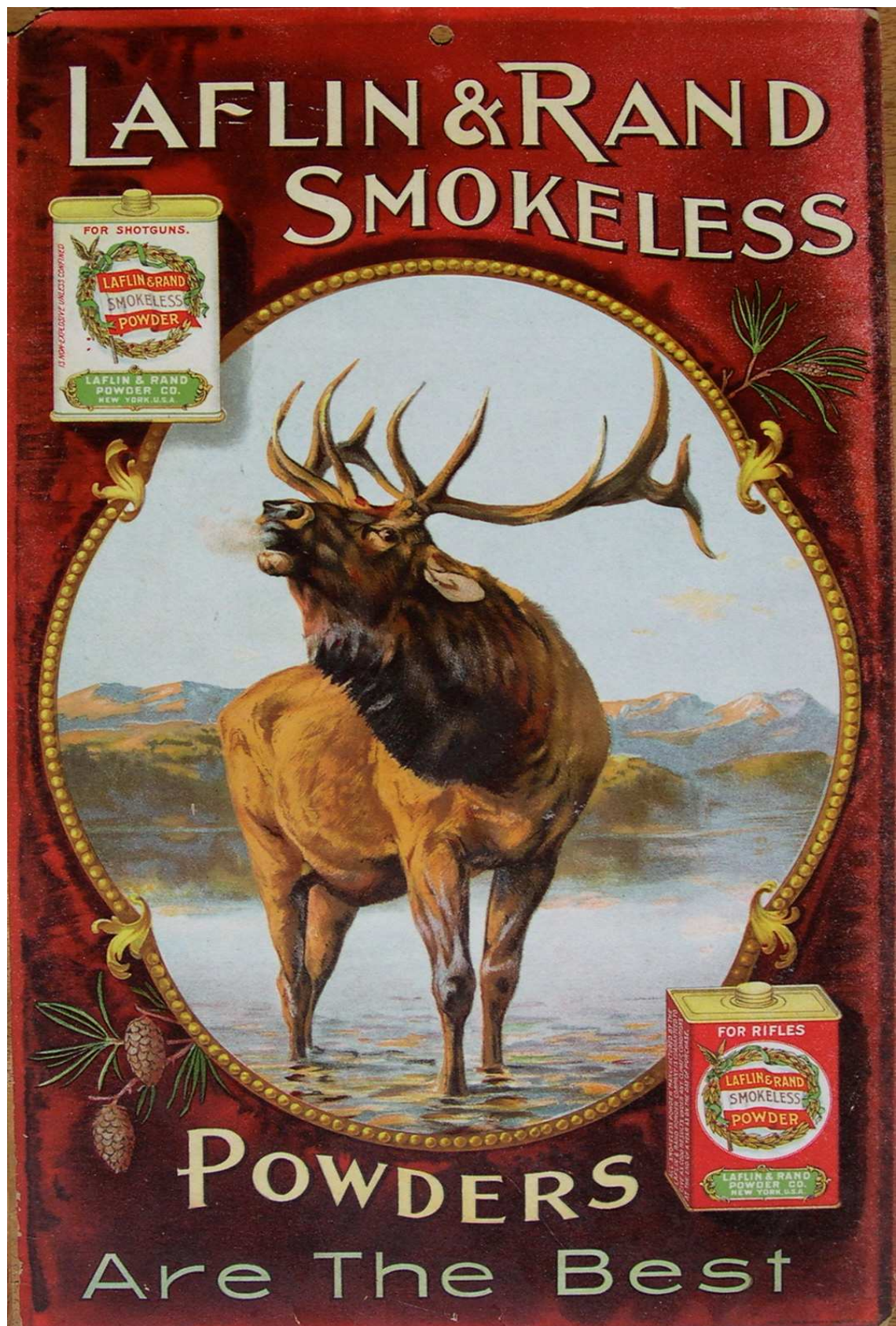
THE SUPERIOR QUALITIES OF THIS POWDER MAKE IT CHEAPER THAN ANY OTHER POWDER AT THE SAME PRICE.

This is a dense nitro powder and a charge of it only occupies one-half as much space as a charge of black powder. 1-3.4 drams (black powder measure) of this smokeless powder weighs about 37 grains.

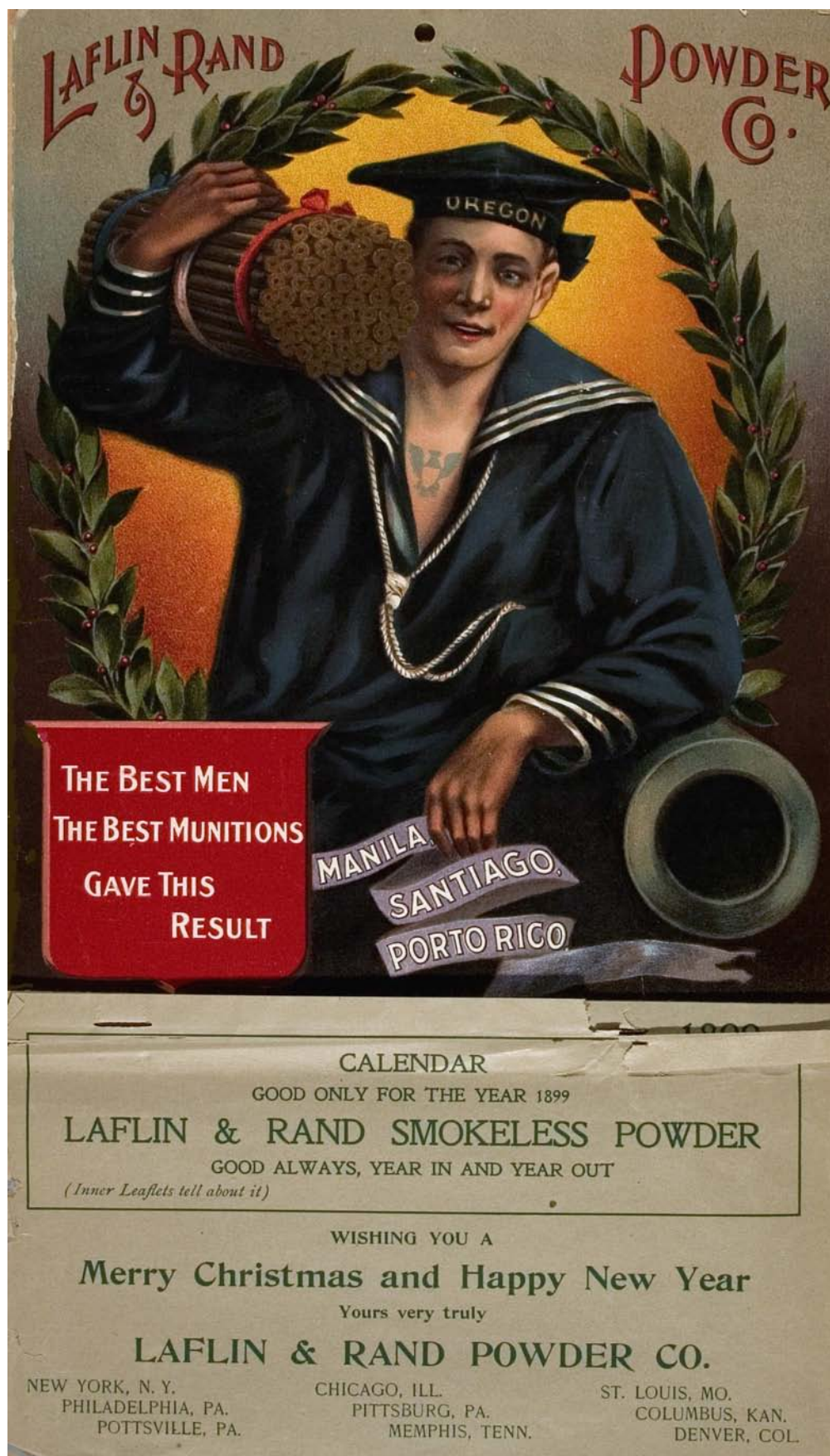
THIS POWDER MUST NOT BE USED IN RIFLES OR REVOLVERS.



1898 Counter Card for Black Powder



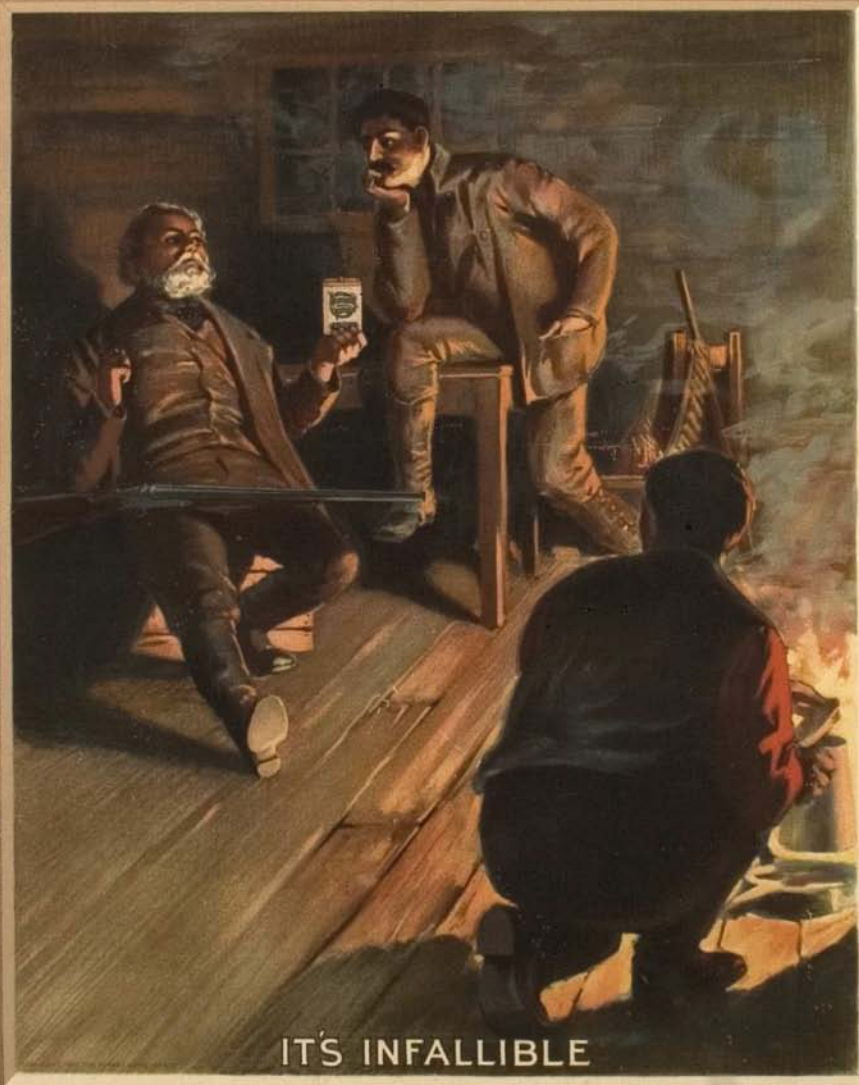
1900 Calendar & 1899 Counter Card



1899 Calendar

LAFLIN & RAND

POWDER COMPANY

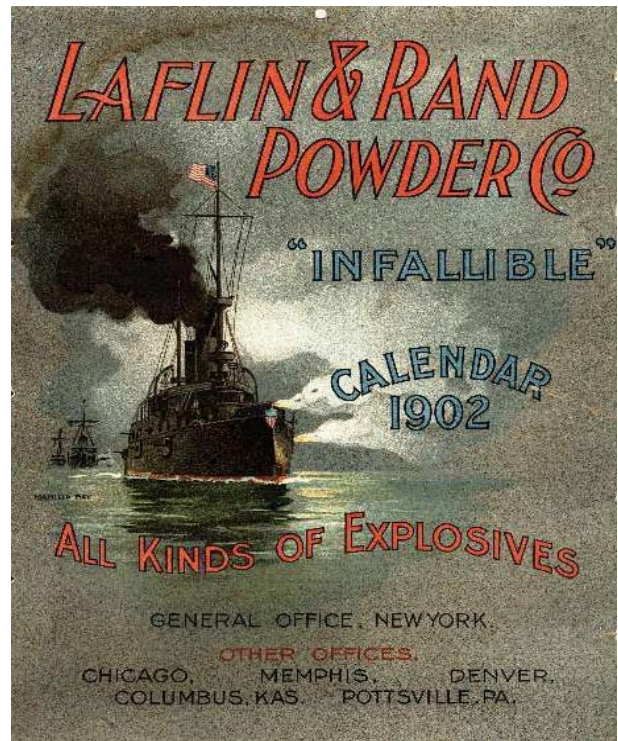


IT'S INFALLIBLE

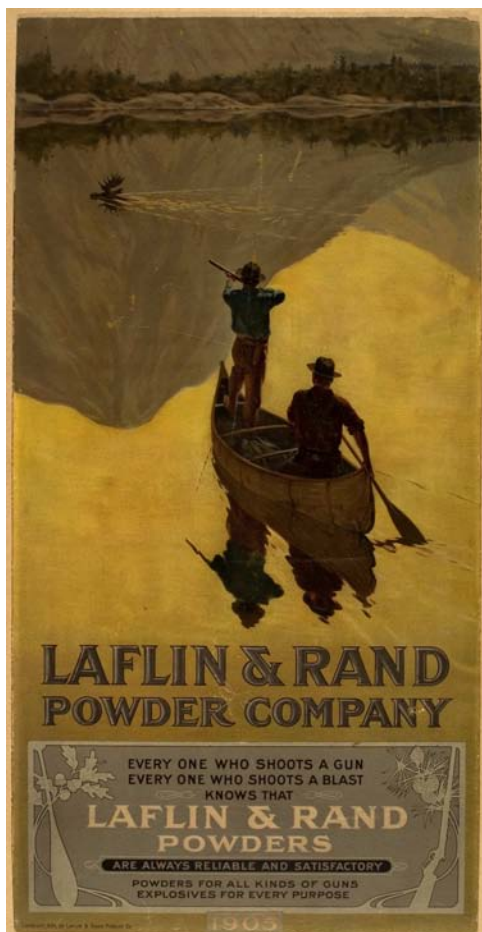
MANUFACTURERS OF POWDER FOR U.S. ARMY AND NAVY

1903

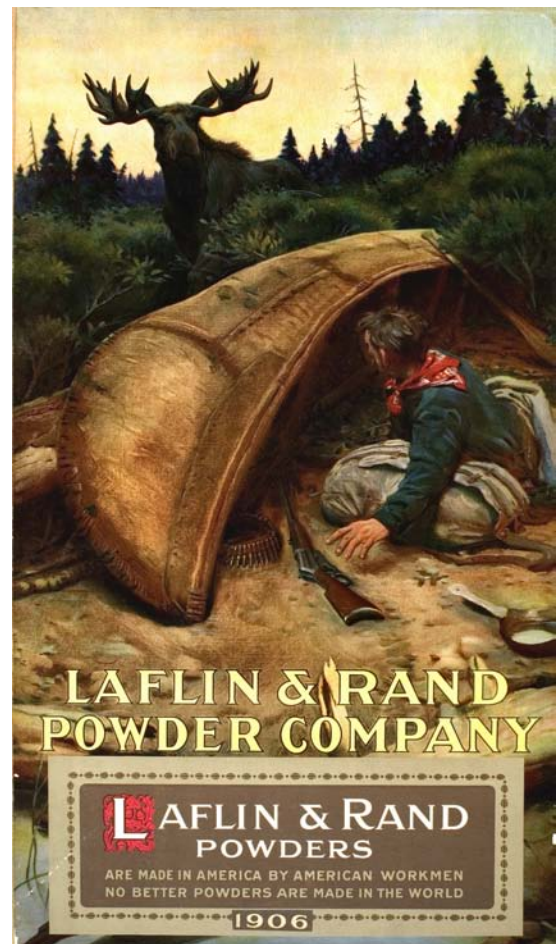
1903 Calendar



1901 American Warriors Calendar Cover 1902 Infalible Ships Calendar Cover



1905 Calendar



1906 Calendar

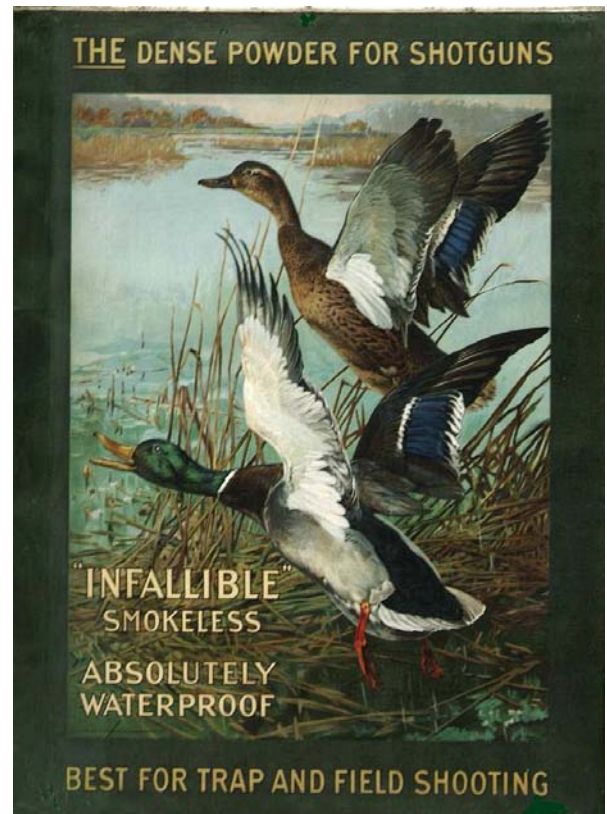


1905 Original Oil Painting by Phillip R. Goodwin

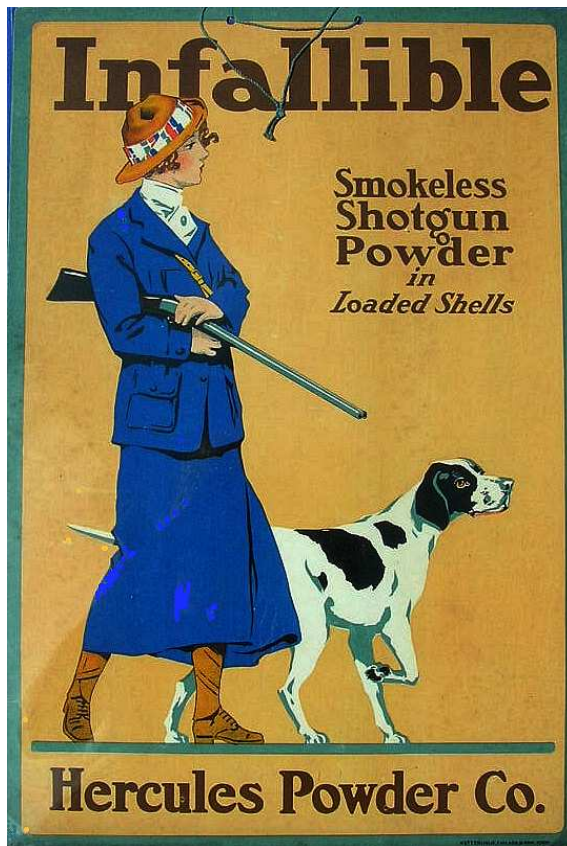
Hagley Museum Accession # 1954.1.523



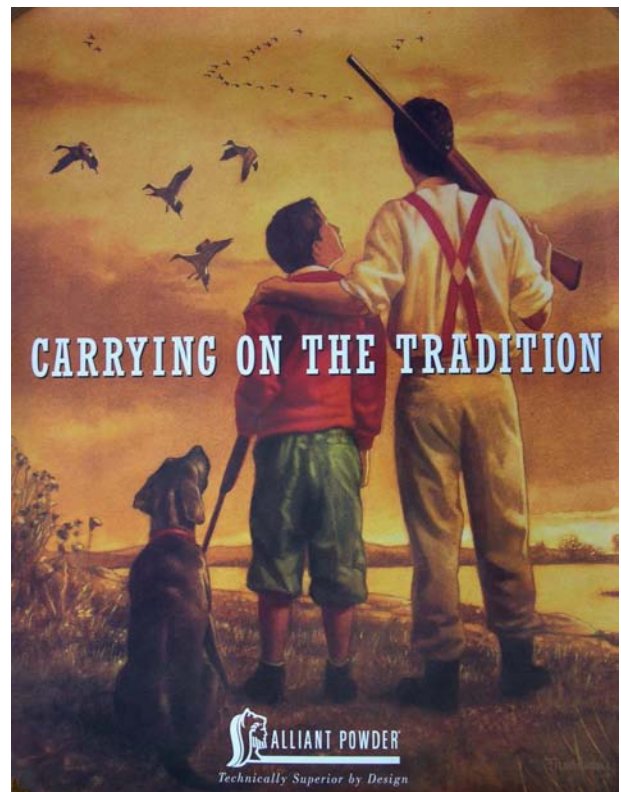
1902 Laflin & Rand Calendar



DuPont Infallible Poster from 1909



Poster from 1915 ordered by the Kenvil plant



1995 Alliant edit & re-issue of a 1936 Hercules Calendar

Seasonal Shot with Infallible Counter Cards from 1903



Spring



Summer



SHOT WITH "INFALLIBLE".
Winter



SHOT WITH "INFALLIBLE".
Autumn

In October 1902 DuPont purchased Laflin & Rand for \$4 million,¹ operating it as a subsidiary while planning to assimilate its assets over the following years, and fully absorbing it by 1907. 1906 advertisements refer to Laflin & Rand, and 1907 advertisements refer to E. I. DuPont. The acquisition of Laflin & Rand added eight dynamite plants, ten black powder plants, and one smokeless powder plant to the eleven black powder plants and one smokeless powder plant DuPont already had in operation.² The additional plants were Orange Mills, Schaghticoke Mills, Empire Mills, in New York, Cherokee Mills in Kansas, Passaic and Pomton (Haskell) in New Jersey, New Plattville in Wisconsin, and Moosic Mills, and Rushdale Mills in Pennsylvania. Acquisition of Laflin & Rand also brought with it the stocks that Laflin & Rand held in other powder companies. Together, these stocks and the stocks DuPont already had in these companies meant that DuPont controlled about two thirds of the explosives business in the United States.^{3,4} In the years 1902 to 1907, DuPont bought out 108 competing companies across the country, including all its major competitors.⁵ Ultimately, DuPont controlled over three fourths of the explosives business in the United States.⁶

With DuPont's acquisition of the International Smokeless Powder Company in 1903, and with its chemist Harry Fletcher Brown, production processes were standardized at all plants, and safety was improved, as was product consistency.⁷

Laflin and Rand was dissolved by DuPont in October of 1912, after having conducted no business as Laflin and Rand since July of 1909,⁸ as a result of the successful Federal anti-trust suit for its prior *Powder Trust* activities in the GTA. DuPont was also forced to divest 42% of its dynamite and 50% of its black powder business⁹ into two newly created/resurrected companies, the Hercules and Atlas Powder Companies. Hercules received the Laflin & Rand smokeless and black powder product lines, along with several of the old Laflin & Rand plants, including its dynamite plants, as well as other assets, and ultimately developed into a substantial corporation in its own right during the First World War. Hercules diversified into chemicals and ultimately abandoned the propellant business in 1995. Atlas Powder Company received a number of the explosives assets, and DuPont kept the single-based (military) rifle propellants, some high explosives, and other chemicals. Today, Laflin & Rand's legacy continues in the Alliant Powder Company with the continued production of Unique and Bullseye powders. Alliant Powder Company has been a division of New River Energetics since 1995. New River in turn is a division of ATK, a company that specializes in military propellants and explosives that also produces rocket motors, including those used on the space shuttle.

Oddly enough, DuPont nearly sold out to Laflin and Rand in 1902, which was then under the good stewardship of Jonathan Haskell. The senior partners in the DuPont Company were all older and in tenuous health, which caused them to agree to offer their company for sale to Laflin & Rand. Junior partners and cousins, T. Coleman, Pierre S., and Alfred I. du Pont were so unhappy about the prospect, that in February 1902, they bought DuPont for \$12 million from the elders, Henry, Eugene, and Frank, who were in declining health, and began the reorganization that made DuPont the giant it became in the 20th century.^{10,11,12,13}

It is entirely likely that Gunpowder Trust members were utterly unaware of the passage of the Sherman Anti-Trust Act of 1890. Certainly no members of the GTA took any actions either to block its passage or to comply with its provisions. Sales agreements continued to reflect the controls established by the GTA well into the 1900s in blatant disregard or blissful ignorance of the Sherman Anti Trust act of 1890. There was certainly no real enforcement of the law until after the turn of the century. DuPont management was not warned directly about this legal problem until 1903 when attorney James Townsend brought it to their attention.^{1,2} DuPont withdrew from the trust in early 1904, effectively dissolving it. This was too little and too late to prevent eventual prosecution. The American public had become alarmed by the existence of some of the large conglomerates by an expose' of Standard Oil in 1903 by Ida Tarbell.³ The impact of this article was so great that some DuPont competitors proudly announced on sales documents that they were not members of the powder trust.

In 1906, disgruntled former DuPont sales operations director Robert Waddell presented quantities of documents from his 20 years at DuPont to federal anti-trust prosecutors.⁴ This resulted in the government's filing suit against DuPont in July of 1907. Four years of testimony and legal wrangling, as well as political efforts, ultimately led to the ruling against DuPont in June of 1911. Thinking that the entire legal battle was politically motivated, it appears that DuPont failed to take the suit very seriously.⁵ Both Pierre and Coleman du Pont were deeply offended and embittered by the ruling and the remedy decided upon in June of 1912, after yet another frustrating year of angry negotiation.^{6,7}

Patents & Trademarks:

1889	PT	409549	Dewar & Abel	Cordite
1890	PT	430212	Maxim	smokeless method
1890	PT	434049	Maxim	double base smokeless powder BP-4477-89
1891	PT	456598	Nobel	Ballistite
1893	PT	507279	Mason Leonard	Leonard (Ruby) smokeless cannon powder
1893	PT	503587	DuPont	shotgun smokeless powder (method)
1894	PT	522978	DuPont	single base powder shotgun smokeless
1894	PT	519702	DuPont	single base grain hardening
1895	TM	32238	Schultze & EC	smokeless 85/1736
1895	PT	541909	Whistler & Aspinwall	W-A .30 powder
1895	PT	541910	"	"
1895	PT	541911	"	"
1899	PT	617766	Peters	King's semi smokeless
1900	PT	640213	Maxim – Schuepphaus	single base smokeless powder
1902	TM	38137	Laflin & Rand	"flag in wreath" logo 99/661
1903	TM	39734	Laflin & Rand	Keystone BP 102/1045
1904	PT	773844	Aspinwall	perforated powder
1905	PT	781926	Wiley – Intl Smokeless	single base smokeless powder
1905	PT	795088	Aspinwall	gas check
1905	PT	802347	Aspinwall	perforated tubular grain
1906	TM	57995	Laflin & Rand	gunpowder 125/1692
1906	TM	58022	Laflin & Rand	explosive powder 125/1693
1909	TM	72657	Laflin & Rand	assign to Dupont 139/459
1909	TM	72658	Laflin & Rand	assign to Dupont 139/458

This is a list of pertinent patents and trademarks that come from a list of over 200 from 1889 to 1919.

Counter Card Backs

A FEW DON'TS.

- DON'T compress nitro powder with a bullet.
- DON'T allow a bullet to slip into the shell and rest on the powder. It runs up the pressures too high.
- DON'T try to use Shotgun Smokeless in a rifle. It burns too quickly and there is no rifle made that could stand the strain.
- DON'T try to do what the makers of the powder tell you not to do. If you do try it, don't enter a complaint over the results.
- DON'T take anything for granted. If you can't find the information you want in this circular, write and ask for it.
- DON'T start to clean a gun unless you make a thorough job of it. A little cleaning is far worse than none at all.
- DON'T try to remove an obstruction from a gun barrel by firing a bullet or a charge of shot through it. Even a loose wad in the barrel will swell the best shotgun made.
- DON'T expect to get good results with nitro powder, when you load it in shells fitted with black powder primers. Use the primers or shells recommended.
- DON'T condemn a powder because you don't get satisfactory results the first trial. Correspond with the makers and they will probably be able to set you right.

Smokeless Pamphlet 1898

Our Powder Won

Principal Events of 1901

- Grand American Handicap (at live birds)
- Grand American Handicap (at targets)
- California State Shoot
- Pennsylvania State Shoot
- West Virginia State Shoot
- Alabama State Shoot
- Rhode Island State Shoot
- Virginia State Shoot
- Kentucky State Championship (at targets)

SMOKELESS, REALLY SMOKELESS

FOR ALL USES

"INFALLIBLE," FOR SHOTGUNS

"W. A. .30 CALIBER," FOR ALL .30-.40 RIFLES

"LIGHTNING,"

FOR ALL OTHER HIGH-POWER RIFLES

"SHARPSHOOTER,"

FOR BLACK POWDER RIFLES

"BULLSEYE," FOR REVOLVERS

STABILITY AND LASTING QUALITIES
OF ALL OUR POWDERS
GUARANTEED UNDER ANY CLIMATIC CONDITIONS

Laflin & Rand Powder Company

New York Chicago Denver San Francisco

Military Men 1901

Laflin & Rand Powders

Are known the world over for their stability and uniformity. No better powders can be purchased than the following:    

For
Shotguns

"INFALLIBLE" SMOKELESS. The only dense powder made in America. Absolutely waterproof. Will keep for years in any climate.

Write for folder called "INFALLIBLE" FACTS.

"ORANGE EXTRA SPORTING," the Standard Black Powder.

For
Rifles.....

"W.—A. .30 CALIBER," for all 30-40 rifles; the Palma Trophy Winner.

"LIGHTNING," for all other high power rifles.

"SHARPSHOOTER," for black powder rifles, also for miniature charges in all high power rifles.

All these Rifle Powders are Smokeless and Waterproof.

For
Revolvers
and Automatic
Pistols....

"BULLSEYE," a smokeless powder which can not be equalled. Absolutely no fouling.

Laflin & Rand Powder Co.

New York Chicago Denver San Francisco

Seasonal Hunting Lady Sketches 1903



WE have been making powder for years—Our reputation as a reliable, responsible company is well established. Therefore when we say that after exhaustive tests we have arrived at the conclusion that our powders are the best on the market, we mean it.      

For
Shotguns..

"INFALLIBLE," a smokeless really smokeless.

"ORANGE EXTRA SPORTING," a black powder known the world over.

Write for folder called "Infallible Facts."

For
Rifles.....

"W. A. .30 CALIBER," for all 30-40 rifles.

"LIGHTNING," for all other high-power rifles.

"SHARPSHOOTER," for black powder rifles, also for miniature charges for all high-power rifles.

For Automatic
Pistols and
Revolvers..

"BULLSEYE." After shooting it you will use no other.

Laflin & Rand Powder Co.

New York Chicago Denver San Francisco

Boys Hunting 1904

Seminal Events in the History of Laflin & Rand

Matthew Laflin begins refining saltpeter in Southwick Massachusetts.	1749	
		1776 The Revolutionary war begins, and the Declaration of Independence is signed.
The Revolutionary war ends.	1783	
		179x Matthew Laflin begins making black powder in Southwick Massachusetts.
DuPont begins making black powder on the Brandywine.	1802	
		1810 Matthew Laflin dies, and his heirs expand the business into Orange County, New York.
The Laflin Powder Company begins making black powder near Newburgh, Orange County, New York.	1818	
		1861 The American Civil War begins.
The American Civil War ends.	1865	
		1866 The Laflin Powder Companies unify and incorporate.
The Laflin and the Smith & Rand companies merge to become the Laflin & Rand Powder Company; Albert T. Rand is elected president.	1869	
		1872 Laflin & Rand joins with DuPont and Hazard et al to form the Gunpowder Trade Association or GTA. L&R acquires controlling interest in Schaghticoke Mills. A.T Rand retires, and Solomon Turck is elected president.
Laflin & Rand increases capital stock from \$650000 to \$1000000 and acquires 230 acres of land at Mead's Basin, New Jersey (Passaic Works).	1873	
		1874 Albert T. Rand dies. Construction of Passaic Mills begins at Mead's Basin, NJ.
Laflin & Rand acquires an interest in the Lake Superior Powder Company and enters into the high explosives business (dynamite).	1878	
		1880 Laflin & Rand and Lamot du Pont jointly establish the Repauno Chemical Company with DuPont to make dynamite.
Lamot du Pont is killed in an accident at Repauno.	1884	
		1890 Sylvester Laflin retires leaving the company Laflin-less. The Sherman Anti-Trust Act is enacted.
DuPont establishes a smokeless powder plant at Carney's Point, New Jersey. Leonard Smokeless Powder Company is formed by Mason Leonard with chemists Whistler & Aspinwall at Pomton Lakes, New Jersey.	1892	
		1894 Leonard Powder Company fails and is re-created as the American Smokeless Powder Company with financial help from Laflin & Rand. W-A .30 Smokeless powder is created for the 30-40 Krag.
Solomon Turck retires, and Jonathan Haskell is elected president of L&R.	1895	
		1896 The "flag in wreath" logo is used for the first time. Laflin & Rand introduces their first smokeless powders.
Laflin & Rand forecloses on the mortgage of American Smokeless, acquiring all assets.	1898	
		1902 Laflin & Rand registers the trademark of the "flag in wreath" logo, first used in 1896. DuPont nearly sells out to Laflin & Rand and is then bought out by a reorganized and invigorated DuPont.
DuPont realizes the legal liability of the Gunpowder Trust (GTA) and disbands it.	1904	
		1907 DuPont transfers all Laflin & Rand assets, fully absorbing Laflin & Rand, and Jonathan Haskell moves to DuPont. The Federal Government files suit against DuPont for restraint of trade under the Sherman Anti-Trust Act of 1890.
Laflin & Rand ceases to do any business as Laflin & Rand.	1909	
		1912 DuPont loses the Federal anti-trust suit, and Laflin & Rand is dissolved by DuPont.
Former Laflin & Rand assets are transferred to Hercules, as ordered by the court.	1913	

History of Laflin & Rand Heritage Smokeless Products

A sales agreement is signed for L&R to sell Troisdorf-Rotweil powders from Europe in the U. S.	1892	
	1896	L&R extends a mortgage loan to American Smokeless. Sporting Rifle Smokeless is introduced.
Sharpshooter for the 45-70 is introduced.	1897	
	1898	L&R forecloses on mortgage and takes over American Smokeless. Shotgun and Revolver Smokeless powders are introduced and discontinued. Infallible, Bullseye, Lightning, and W-A .30 Calibre Smokeless are introduced.
W-A Shotgun Smokeless is introduced.	1899	
	1900	Unique is introduced as a reduced load powder for rifles. Sporting Rifle Smokeless and W-A Shotgun Smokeless are discontinued.
Laflin & Rand is bought by DuPont and operated as a wholly owned subsidiary.	1902	
	1904	Marksman is introduced as a reduced load “gallery” powder for rifles. This is L&R’s only single base powder.
All Laflin & Rand assets are transferred to DuPont. The Laflin & Rand name disappears but the “flag in wreath” logo lives on. Marksman is renamed DuPont Gallery Rifle #75 .	1907	
	1908	Bear and Stag (non-canister) smokeless powders are introduced.
Laflin & Rand is dissolved by DuPont.	1912	
	1913	DuPont is broken up by Federal anti-trust action, and the Laflin & Rand heritage assets go to Hercules.
Hercules discontinues Stag .	1914	
	1928	DuPont discontinues Gallery Rifle #75 (formerly Marksman).
Hercules discontinues W-A .30 Caliber Smokeless .	1930	
	1936	Hercules discontinues Infallible as a canister powder.
Hercules discontinues Bear .	1937	
	1948	Hercules discontinues Sharpshooter .
Hercules discontinues Lightning . Hercules discontinues use of “flag in wreath” logo.	1958	
	1960	Unique is reformulated by Hercules to reduce the NG content.
Hercules propellants are acquired by ATK, including Bullseye and Unique .	1995	
	2001	Unique is reformulated for cleaner burning by ATK.



No Harm Done

Ever drop a shell overboard? Ever drop a whole box overboard? There's tragedy for you! It means an empty game bag and the laugh when you get back to camp. For your hard luck story never is believed. Don't run the risk of having to tell one. Avoid all possibility of powder deterioration through any cause by using shells loaded with the Hercules Brand

"INFALLIBLE" Smokeless Shotgun Powder

Water will not hurt it. You can leave it for years in your ducking boat or in the dampest place you can find and it will always give high velocity, even pattern, and light recoil. Test this for yourself by putting some "Infallible" in water. Let it stay there as long as you like, then shake the moisture with blotting paper, load up and see how it shoots. You will be surprised but you will be convinced that "Infallible" is absolutely water proof.

"Infallible" is equally impervious to extremes of heat and cold. Excessive cold will not weaken its action and excessive heat will not make it too strong. These are important considerations in all field shooting, for in almost every part of the world temperatures that affect less stable powders are encountered. "Infallible" has undergone the severest tests and has proved to be, "always the same under all conditions of climate."

Write Dept. B for free booklets giving full information about this and other Hercules Powders.

HERCULES POWDER CO.

Wilmington, Del., U. S. A.

1913

"INFALLIBLE" SMOKELESS

ABSOLUTELY WATERPROOF

ALWAYS THE SAME UNDER ANY CONDITIONS



1906

INFALLIBLE SHOTGUN SMOKELESS POWDER

ITS QUALITIES ARE AS FOLLOWS:

ABSOLUTELY SAFE,
UNIFORM IN VELOCITY,
PERFECT IN PATTERN,
OF GREAT PENETRATION,
LEAVES SHELLS IN GOOD CONDITION,
LOW BREECH PRESSURE,
NO UNBURNED GRAINS,
PERFECTLY SMOKELESS.

FORMULA HAS BEEN PROVED AS TO ITS PERFECT KEEPING QUALITIES BY THREE YEARS SERVICE IN THIS COUNTRY, CUBA, PORTO RICO, THE PHILIPPINES AND CHINA.

(MANUFACTURERS STATEMENT.)

MOST LOADERS OF SHELLS ADVISE AGAINST THEIR BEING STORED IN A VERY DRY OR A VERY DAMP PLACE. IF SHELLS ARE LOADED WITH INFALLIBLE SMOKELESS, SUCH A CAUTION IS ABSOLUTELY UNNECESSARY AS IT WILL GIVE THE SAME RESULTS A MONTH OR A YEAR AFTER BEING STORED IN A DAMP, DRY, HOT OR COLD PLACE AS ON THE DAY OF PURCHASE.

LAFLIN & RAND POWDER COMPANY.
NEW YORK. CHICAGO. DENVER.

1901

LAFLIN and RAND POWDER CO

INFALLIBLE SMOKELESS POWDER

REALLY SMOKELESS

NEW YORK ~ CHICAGO ~ DENVER

1904

TO INSURE A GOOD RECORD AT THE TRAP

HAVE YOUR SHELLS
LOADED WITH

LAFLIN & RAND-

W-A
SMOKELESS
POWDER

ABSOLUTELY
UNIFORM
IMPERVIOUS
TO MOISTURE

**LAFLIN & RAND-
POWDER CO.**
NEW YORK, CHICAGO, DENVER.

1897

The Result of Over a Century's Experience

Perfection in Powder-making is only achieved by exercising the most scrupulous care in the selection and preparation of raw materials, employing skilled workmen exclusively, and using only the most improved modern mechanical equipment. This is the Du Pont method and accounts for the unequalled reputation among sportsmen enjoyed by the Du Pont brands of SMOKELESS SHOTGUN POWDERS.

One of the most popular of these brands is:



A dense powder that is absolutely uniform in velocity and pattern. Waterproof. Not affected by extremes of heat or cold.

"Infallible" Smokeless Shotgun Powder will not pit the gun barrels.

Unequalled for Field and Trap Shooting

See That Your Shells Are Loaded With "Infallible"

Send Today for "Infallible" Booklet No. 54. It Gives Best Loads for Various Game and Other Information of Value to Shooters. It's Free.

E. I. du Pont de Nemours Powder Company

Established 1802

Pioneer Powder Makers of America

Wilmington, Del.

1912

"Infallible"



BRINGS DOWN THE DUCKS.
THE SMOKELESS POWDER PAR
EXCELLENCE.

Laflin & Rand Powder Company
New York City

1905

SCRIBNER'S MAGAZINE ADVERTISER

FOR BIG GAME
SMOKELESS POWDER
IS NOT A LUXURY
BUT A NECESSITY.



SPECIFY "LIGHTNING" FOR
HIGH POWER RIFLES, OR
"SHARPSHOOTER" FOR BLACK
POWDER RIFLES.

THESE BRANDS ARE GOOD IN ANY CLIMATE.

Laflin & Rand Powder Co., New York City

1905

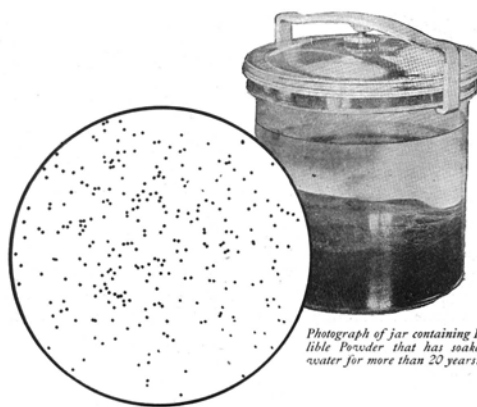
**LAFLIN
AND
RAND
POWDER CO**

**MAKERS OF POWDER
for U.S. GOV'T.**

**WATERPROOF SMOKELESS POWDER
FOR ALL KINDS OF
RIFLES, REVOLVERS & SHOTGUNS**

CORRESPONDENCE INVITED
99 CEDAR ST. NEW YORK

1902



Photograph of jar containing Infallible Powder that has soaked in water for more than 20 years.

77% pattern made with Infallible Powder taken from the jar shown here.

Infallible Stood the Test!

A sample of Infallible smokeless shotgun powder has been kept in water in this jar since 1899. For over 20 years—ever since the Maine was sunk—probably since you were a child—this powder has been under test by water, powder's worst enemy.

Last January a portion of it was taken out, dried between blotters (to remove surface moisture) and then loaded in shells. One and one-fourth ounces of No. 7 chilled shot were loaded on top of 28 grains of this old, time-tried Infallible.

When fired in a plain, standard grade 12 gauge pump gun, it made a 77 per cent pattern on a 30" circle at 40 yards.

This is 7 per cent higher than the average full choke pattern.

When you buy shells loaded with Infallible you get Quality—That Lasts.

HERCULES POWDER CO.

1015 Orange Street
Wilmington Delaware

1920

This Won't Hurt Infallible

"Now don't get excited Jim. Just take your time about fishing them out. Remember that those shells are loaded with Hercules Infallible. That powder is really waterproof."

"Don't worry about getting a little water on shells that are loaded with Infallible!"

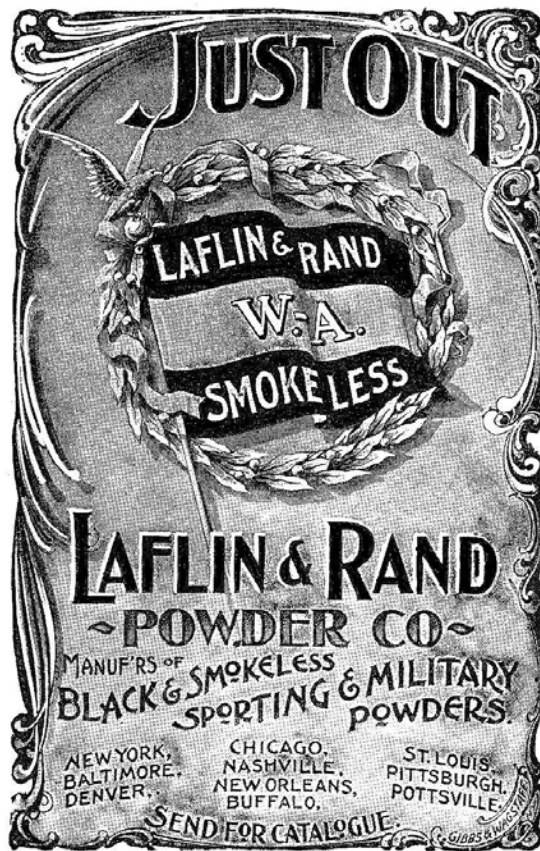
**HERCULES
Smokeless Shotgun Powder
INFALLIBLE and EC.**

HERCULES POWDER CO.

1015 Orange Street
Wilmington Delaware



1920



1898



1898



Lunch Always Tastes Good

if you have found the birds, if your dogs have worked well, and above all if your shells have been right. Shells loaded with

"INFALLIBLE"

SMOKELESS

are always right. "INFALLIBLE" SMOKELESS is the only dense powder made in America and is the best dense powder made anywhere. It is a shotgun smokeless powder that is made to be used in any and all kinds of weather. It is not affected by heat or cold, dryness or dampness. Its accuracy and reliability make it what its name implies—"INFALLIBLE."

Nobody can make a mistake in specifying "INFALLIBLE" SMOKELESS in their loaded shells

(N. B.—Du Pont Rifle Powders meet all requirements. Write for descriptive folders, stating caliber and make of rifle.)

E. I. Du Pont de Nemours Powder Company
Established 1802
Wilmington, Delaware



1907

SPORTING GOODS



When Walking Up to the Covey

The knowledge that your shells are loaded with a powder of recognized quickness and uniformity inspires confidence and steadies your aim.

"INFALLIBLE"

SMOKELESS—The Best Dense Powder for Shotguns

is guaranteed to give better patterns with high velocities than any other dense powder on the market.

"INFALLIBLE" SMOKELESS is not affected by heat or cold, dryness or dampness, and keeps perfectly for years under all conditions. Why not, therefore, specify "INFALLIBLE" SMOKELESS in your shells for Trap and Field Work?

(N. B.—Du Pont Rifle Powders meet all requirements. Write for descriptive folders, stating caliber and make of rifle.)

E. I. du Pont de Nemours Powder Company
Established 1802
Wilmington, Delaware



1907

The Laflin & Rand Smokeless Canister Powders:

All L&R smokeless powders were “dense” powders as opposed to “bulk” powders. All their powders except Marksman were also “double-base”, using both NC and NG. Smokeless powders were 2 to 3 times the price of black powders per pound, but only about one third as much was needed. L&R also entered the smokeless market relatively late owing to safety and quality concerns. In some cases, there were several versions or types of the same powder. Canister powders are those blended for lot-to-lot consistency specifically for reloaders. These are the “best”, most consistent grades of any type that can be made.

L&R (Shotgun) Smokeless powder was introduced and discontinued (in favor of Infallible) in 1898. It consisted of orange colored disks. L&R Shotgun Smokeless is different from Infallible, and measures differently. In the 12 gauge shotgun, a charge of 42 grains weight and 1-1/8 ounces of shot was regarded as appropriate for hunting (3-1/4 dram equivalent).

L&R Infallible Shotgun Smokeless Powder was introduced in 1898 as an improvement over Shotgun Smokeless. Among the improvements was a graphite coating to help control burning speed and to aid in handling. It consisted of shiny gray black discs .065” dia. X .006”. Infallible was 40% NG by weight. Originally, it came in a distinctive eight-ounce (3500 grain) tin for \$1. L&R Infallible became DuPont Infallible in 1907 and went on to become Hercules Infallible in 1912. Infallible loads required less powder than Shotgun Smokeless. In the 12 gauge shotgun, a 24 grain charge and 1-1/8 ounce shot load was considered appropriate for hunting (3-1/4 dram equivalent). Infallible in canisters was probably discontinued by Hercules in late 1936 or early 1937¹, to be replaced by Red Dot. Infallible was however still available at least through 1948 in 27 pound kegs. Infallible continued to be produced by Hercules as a non-canister powder for ammunition manufacturers and is still produced today (2007) by Alliant. The Infallible name became almost a generic name for an entire group of similar custom powders made for ammunition manufacturers. Until 1960, the only difference between Infallible and Unique was the granulation.

L&R Unique Smokeless Rifle Powder was introduced in 1900 as a reduced load powder for rifles and pistols. It consisted of shiny gray-black discs .065” dia. X .008”, and had a 40% NG content. It is believed that it was originally created for military use in training for very light or “gallery” loads. It was very strangely packaged in the same tin Infallible came in with a very plain paper label with 2040 grains or 4-2/3 ounce contents. Neither pricing nor promotional literature has been found for L&R Unique. In the .38 Long Colt (pistol), 3 grains of Unique behind the standard 150 grain lead bullet was considered good for practice out to 60 feet. In the 30-40 Krag, 7 to 9 grains of Unique was good from 100 to 200 yards with a 150 grain lead bullet for practice. It became DuPont Unique in 1907 and became Hercules Unique in 1912, and became Alliant Unique in 1995. Unique and Infallible were made from the exact same formula, the only difference being the granulation. For moderate loads, Unique and Infallible were interchangeable. Infallible measures like Unique; in fact, the L&R Unique can has a powder measure inside it engraved Infallible. Hercules reformulated Unique in 1960, reducing the NG content by half, and Alliant reformulated it again in 2001 for cleaner burning. It is still manufactured in 2007 as a shotgun, pistol, and reduced load rifle powder.

L&R Revolver Smokeless Powder was introduced and discontinued, in favor of Bullseye in 1898. The only examples of this powder tin, so far observed, have a paper label glued to the back for Bullseye. More data still needs to be found for this powder.

L&R Bullseye was introduced in 1898 to replace Revolver Smokeless. This is one of those powders that had several types. There were two versions of Bullseye, the first of which was known as Bullseye #1 or “dust” Bullseye. Two different sources refer to this being the “sweepings” or screenings left over from the manufacture of Infallible, with very fine irregular triangular or diamond shaped grains.¹ Close examination of two samples indicate that it was half moon kernels created similarly to Infallible but cut so thin as to create incomplete rounds. L&R Bullseye #2 was supposed to have been brought out in 1904 as small round black discs .038” dia. X .003”, ostensibly because there were insufficient quantities of #1 to meet demand. See further discussion under “Suspensions”. It contained 40% NG. Four grains of Bullseye was the normal load for the .45 (long) Colt revolver. This Bullseye #2 is what we identify today as Bullseye, and this author believes that it has not changed formula since its introduction in 1898. It went to DuPont in 1907 and to Hercules in 1912. Bullseye, Unique, and Infallible were all made from the same formula, the only difference being granulation.² It is still manufactured by Alliant in 2007.

L&R Sporting Rifle Smokeless was introduced in 1896 as a smokeless substitute for black powder in older rifles and revolvers and discontinued in 1900. It was blond in color, not perforated or graphited .018 “ thick and the diameter about .040 “. Twenty-four grains were standard for the 45-70 and ten grains for the .45 (long) Colt revolver.

L&R Lightning was introduced in 1898 for use in older rifles and revolvers as a black powder replacement. Lightning replaced Sporting Rifle Smokeless. There was a type 2 of this powder produced under influence from DuPont, from 1903 probably until 1929. It consisted of black perforated tubes .06” dia. X .05” and 30% NG. It proved to be less satisfactory than type 1 which returned to the market and consisted of perforated black discs .08” dia. X .025” and 30% NG. The difference between type one and two is purely the grain size. Lightning was produced for a very long time, finally being discontinued in 1958³ by Hercules. Lightning was made from the same formula as W-A 30, with a different granulation. Eight ounces originally cost \$1 and sixteen ounces cost \$2. Ten and one half grains would give 950 feet per second with the 250 grain lead bullet in the .45 Colt, making it very roughly Reloader 7 speed.

L&R Sharpshooter was also known as .45 Cal. Springfield Smokeless, and made specifically for the Springfield .45 rifle (45-70). It was introduced in 1897 and was not discontinued until 1948.⁴ It consisted of perforated black discs .08” dia. X .015”, with 40% NG. This powder also had a second type produced under influence from DuPont between 1903 and 1914. It also consisted of small black perforated discs .08” dia. X .022”, but with 30% NG. Sharpshooter #2 was made with the same formula as W-A 30, but with a different granulation. A 6-1/2 pound can originally cost \$7.75, or \$1.20 per pound. Ten to twenty two grains could be used with a 405 or 500 grain bullet, with twenty grains the standard load. It had a burning speed somewhere between Blue Dot and 2400.

L&R W-A .30 Calibre Powder was also known as .30 Caliber Smokeless, created originally by Whistler and Aspinwall for the Leonard and then the American Smokeless Powder Companies, for the 30-40 Krag government cartridge. It was not introduced to the public by L&R until 1898, even though it had been in production for the government since 1895.⁵ It consisted of yellow tubular or hexagonal grains .08” dia. X .04” and containing 30% NG. By 1898, all L&R powders seem to have been graphited. After 1900, the type two powder consisted of perforated black discs – (graphited) .08” dia. X .045”.

Lightning was made with the same formula, but a different granulation.¹ Hercules discontinued W-A .30 Caliber in 1930.² A one-pound can originally cost \$1.25. Thirty six grains was the standard load with a 220 grain bullet in the 30-40 Krag. It had a burning speed somewhere between that of Reloader 7 and Reloader 12.

W-A Shotgun Smokeless was produced from 1899 to 1900. (Whistler-Aspinwall hard grain shotgun powder) A charge of 63 grains was regarded as a load suitable for duck hunting in the 12 gauge shotgun.

L&R **Marksman Powder** was introduced in 1904 as a reduced load or “gallery” powder for target practice. It consisted of tiny gray, fibrous, ovoid grains and was the only single base L&R powder (made without NG).³ Marksman became DuPont Gallery Rifle #75 in 1907 and was produced by DuPont until 1928. It was not passed on to Hercules. It must have had a burning speed between Unique and Blue Dot, but that is speculation since it was designed for reduced loads only. (Hercules later made a powder that they also called Marksman, but it was an altogether different double base (40% NG) disc powder.)

Laflin & Rand non-canister powders:

L&R 1908 **Bear Smokeless Rifle Powder** was made for ammunition manufacturers and not as a canister powder, but some became available to reloaders. Bear was introduced by DuPont in 1908 and discontinued by Hercules in 1937. It consisted of black tubular grains with 40% NG.⁴

L&R 1908 **Stag Smokeless Rifle Powder** was also made exclusively for ammunition manufacturers. Stag was produced by DuPont in 1908 and discontinued by Hercules in 1914. It consisted of black tubular grains with 30% NG.⁵

.22 Caliber Smokeless (rim fire) non-canister (1898 – 190?) was made exclusively for ammunition manufacturers for use in .22 caliber rim fire cartridges, in particular the .22 long.⁶

Powders marketed in the U.S. by L&R:

Schultze EC & EC Improved Troisdorf-Rottweil



Stock certificate once belonging to Solomon Turck, president of Laflin & Rand

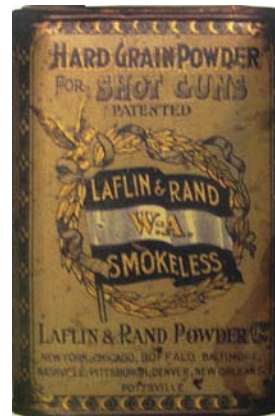
Laflin & Rand Smokeless Powders



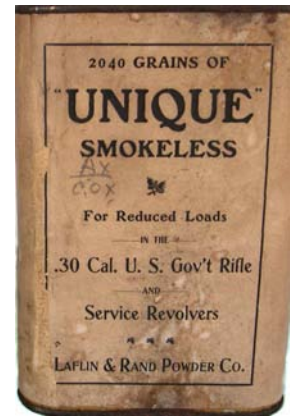
Shotgun Smokeless



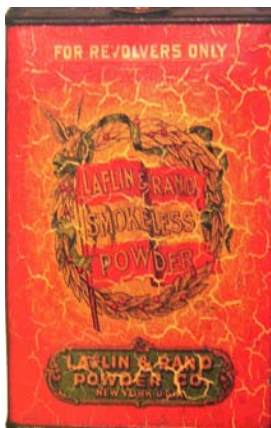
Infalible



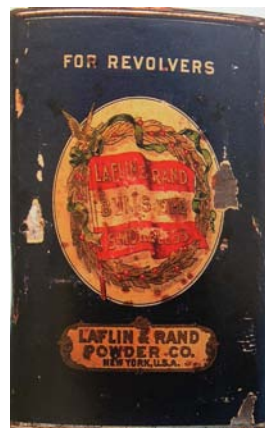
W-A Shotgun



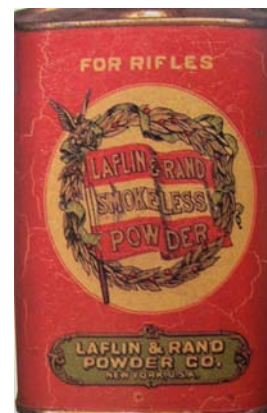
Unique



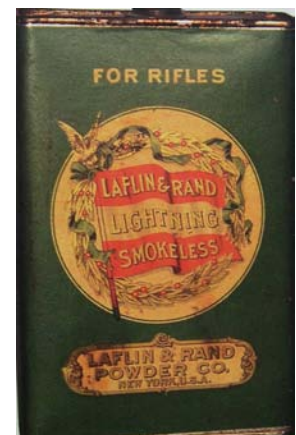
Revolver Smokeless



Bullseye



Sporting Rifle Smokeless



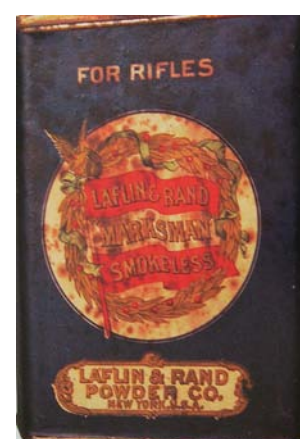
Lightning



Sharpshooter



W-A .30 Caliber



Marksman

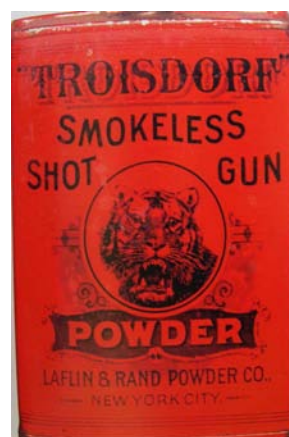
Powders Sold in the United States by Laflin & Rand



Schultze

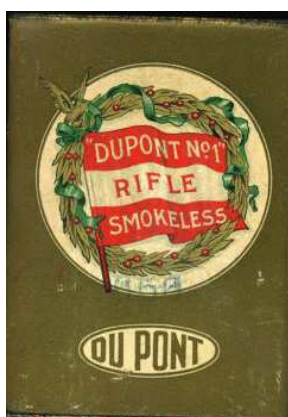


E C



Troisdorf

Powders Bearing the Laflin & Rand Logo that were not L&R Powders



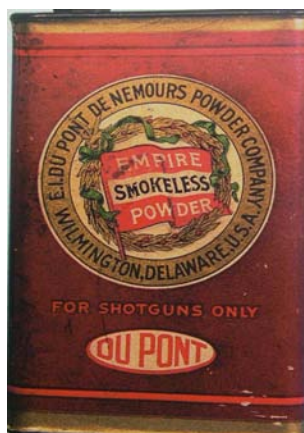
DuPont #1 Rifle



1909 Rifle Smokeless



R S Q



Empire Smokeless (Nobel)



Ballistite (Nobel)





Bullseye (1950s)



Infallible (1920s)



Unique (1950s)

Shotgun Smokeless

10 Ga.	45 – 55 gr.	1-1/8 to 1 ¼ oz shot	12 Ga.	37 – 42 gr.	1-1/8 to 1-¼ oz shot
16 Ga.	28 – 32 gr.	1 oz shot			

Infallible

10 Ga.	26 – 30 gr.	1-1/8 to 1 ¼ oz shot	12 Ga.	20 – 26 gr.	1-1/8 to 1 ¼ oz shot
16 Ga.	18 – 20 gr.	1 oz shot	20 Ga.	16 gr.	7/8 oz shot

Unique

Revolver (.38 S&W?)	150 gr.	3 gr.	800?	range 60 feet	
Rifle (.30/40 Krag)	40 – 100 ft.		“0” buckshot or 100 gr.	.303 Savage or 85 gr.	.32 S&W short 3 – 3.5 gr.
	100 – 200 yds.		150 gr. Ideal # 308241 or Hudson #308223	1200 – 1300 fps	7 – 9 gr.

Revolver Smokeless – Bullseye #1

.32 S&W	98 gr.	2 gr.	765?	.32 Long Colt	80 gr.	2 gr.	770?
.38 Long Colt	148 gr.	3 gr.	810?	.38 S&W Mil.	158 gr.	3 gr.	750?
.44 S&W Russian	246 gr.	4 gr.	650?	.44 Colt	210 gr.	4 gr.	660?
.45 Colt	250 gr.	4 gr.	710?				

Bullseye #2

.32 S&W	98 gr.	2 gr.	765?	.32 Long Colt	80 gr.	2.5 gr.	770?
.38 Long Colt	148 gr.	2.5 gr.	810?	.38 S&W Mil.	158 gr.	2 gr.	750?
.44 Colt	210 gr.	4.5 gr.	810?	.44 S&W Russian	246 gr.	4.5 gr.	650?
.45 Colt	250 gr.	5 gr.	850?	.45 S&W	230 gr.	5 gr.	710?

Sporting Rifle Smokeless (Rifles & Revolvers)

.25/20 & 21	86 gr.	8 gr.	1400?	.32/20	170 gr.	10 gr.	1400?
.32/40	165 gr.	8 gr.	1200?	.38/55 & 56	255 gr.	18 gr.	1450?
.44 Win (.44 WCF)	200 gr.?	17 gr.	1500?	.45/70 405 gr. lead		24 gr.	1310?
.45/90 405 gr. lead		28 gr.	1600?	.32 S&W	150 gr.	5 gr.	800?
.38 S&W	158 gr.	8 gr.	830?	.38 Colt	148 gr.	8 gr.	830?
.44 S&W Russian	246 gr.	8 gr.	760?	.45 Colt	250 gr.	10 gr.	920?

Lightning

.25/35 & 36	117 gr.	19 gr.	2100?	.303 Savage	190 gr.?	27 gr.	2000?
7mm (Mauser)	139 gr.	27 gr.	1920?	.303 British	215 gr.?	28 gr.	1790?
.30/30 Win & Mar	170 gr.	23 gr.	1970?				

Sharpshooter

.32/40	165 gr.	13 gr.	1200?	.38/55 & 56	255 gr.	18 gr.	1450?
.45/70	405 gr.	21 gr.	1300?	.45/90	405 gr.	26 gr.	1600?

W-A .30

.30 cal. (30/40 Krag)	220 gr.	43 gr.	1930?				
.30/40 Winchester	150 gr.	34 gr.	1920?	.30/40 Remington	150 gr.	34 gr.	1900?

W-A Shotgun

10 Ga.	63 – 75 gr.	1-1/8 to 1 ¼ oz shot	12 Ga.	50 – 63 gr.	1-1/8 to 1-1/4 oz shot
16 Ga.	37 – 50 gr.	1 oz shot	20 Ga.	31 – 43 gr.	7/8 oz shot

Marksman

.25/20 Marlin	86 gr.?	7 gr.	1400?	.25-35 WIN & Mar	117 gr.	10 gr.	2000?
.30/30 Win.	150 gr.?	10 gr.	1200?	.30/40 Krag	150 gr.	9 – 16 gr.	950 – 1200?
.30/40 Win	150 gr.?	16 gr.	1100?	.32WM&MarlinSpec	170 gr.	13 gr.	1400?
.33 WCF	195 gr.?	15 gr.	1550?	.303Savage	154 gr.	12 gr.	1500?

Notes: The loading tables on the cans do not specify bullet weights or types, and expected velocities are also not specified. This transcription makes some assumptions about bullet weights and types, and derives velocities from old reloading manuals. Finally, some of the tables for individual powders are only partial listings, since some of the cartridges listed on the cans have passed into obscurity. This data is provided for informational and comparative purposes only. The author does not advocate loading or firing any of these old cartridges, particularly in antique firearms.

Laflin & Rand Black Powders:

The “Orange” name comes from the original production plant name, Orange Mills in Orange County, near Newburgh, New York (near West Point). Opened in 1808-12, it stopped production in 1901, was dismantled by Hercules in 1913, and sold in 1919.¹ “Orange” brand powders were black powders. Some powders were available in 1-pound canisters, while others were only available in 25-pound kegs or fractional kegs.

FFF ⇔ #1

FF – F ⇔ #2

Orange Rifle Extra,	(BP)	F, FF, FFF	Canister .78 / lb
Orange Rifle Powder,	(BP)	C, F, FF, FFF	.37 / lb kegs
Orange Ducking Shotgun,	(BP)	1, 2, 3, 4, 5	“General Use” .76 / lb Canister
Orange Lightning,	(BP)	3, 4, 5, 6, 7	“Best Grade” Canister 1.06 / lb
Orange Special,	(BP)	1, 2	“Strongest” kegs
Orange Creedmoor,	(BP)	F, FF, FFF	.65 / lb kegs
Audubon,	(BP)	1, 2, 3, 4	.76 / lb kegs
New York Sporting,	(BP)	FFF	.35 / lb Canister

L&R also produced a number of products expressly for industrial blasting (mining, etc.). Blasting “A” (potassium nitrate) and Blasting “B” (sodium nitrate) Blasting products were nearly three-quarters of their production. (DuPont produced some 4600 tons of black powder per year during the 1870s, about 71% for blasting).²

1 dram BP charge is 1/16 oz or 27.3 grains

3 dram BP charge is 3/16 oz or 82 .0 grains, and is 1-1/8 oz shot at 1200 fps (12 Ga)
(Unique 3 dram equivalent charge 22 Gr 1-1/8 oz - 12 Ga)

Powder Granulation:	A1	Pass	6	Not Pass	10	.0937 - .1870
	Fg		14		20	.0582 - .0689
(per inch mesh)	FFg		16		24	.0376 - .0582
	Musket					.0280 - .0555
	FFFg		24		46	.0117 - .0376
	FFFFg		46		60	.0111 - .0170
	FFFFFg		60		..	.0041 - .0138
	Meal (Blasting and Pyrotechnics)					.0029 - .0098 ³

Alfred Nobel’s 1875 thoughts on “the old article”, black powder:

That old mixture possesses a truly admirable elasticity which permits its adaptation to purposes of the most varied nature. Thus, in a mine it is wanted to blast without propelling; in a gun to propel without blasting; in a shell it serves both purposes combined; in a fuse, as in fireworks, it burns quite slowly without exploding. Its pressure exercised in these numerous operations, varies between one ounce to the square inch in a fuse and 85000 pounds to the square inch in a shell. But like a servant of all work, it lacks perfection in each department, and modern science, armed with better tools, is gradually encroaching on its old domain. ^{4,5}

Hercules discontinued all black powder production, including “Orange” branded powders by 1958.



Suspicious:

L&R **Unique** was introduced for government and National Guard units and possibly some state militias, for reduced loads in rifle cartridges in 1900. Unique was a slightly coarser version of Infallible, and was made from the exact same formula. Even though it was sold as a canister powder to the public, it did not appear on sales or marketing materials. The packaging was also very generic and “plain” in appearance compared to the other powders, and packaged in an odd quantity of 2040 grains (4-2/3 oz). The only available reference says it was introduced in 1900, before acquisition by DuPont. The only record so far found of DuPont having made and packaged Unique is a 1909 DuPont catalog. Hercules did make and sell Unique as a gallery rifle powder. Later, Hercules marketed Unique primarily as a shotgun and pistol powder.

Bullseye cannot ever have been the fines left over from the manufacture of Infallible, as alleged by Sharpe,¹ because it was always an extruded (pressed) powder and never cut from sheets. This method of manufacture would not leave the triangular or diamond shaped “fines” as is described. Furthermore, because Infallible was cut or sliced from long strands of powder, it generates very little in the way of “fines” in any case, and any out sized granules produced would mostly be longer or larger than Infallible, not smaller. Finally, uncontrolled very fine powder as is described would be extraordinarily fast burning and very prone to detonation. That would be very hard on the firearm and ultimately the shooter.

So, just what were Sharpe and others referring to as “dust Bullseye or Bullseye #1? Could it have been mislabeled or end-of-production L&R Revolver Smokeless? How about fines from Schultze or EC? Could there have been confusion with Ballistite, since some Ballistite containers carried the L&R logo? Infallible and Ballistite were virtually identical compounds with the difference that Ballistite was in fact rolled and cut from sheets, as opposed to being extruded and cut.² Though these questions may have to remain unanswered, my suspicion is that they were referring to L&R Revolver Smokeless, which may have had somewhat less energy by weight than Bullseye.

No evidence whatsoever has been found of the existence of a Bullseye Powder Company as originators of Bullseye powder and bought up by L&R.

Most likely, the original 30-40 Krag cases were tinned inside and out to prevent corrosion from the mercuric primers in use at the time. Because of the volume of fouling from black powder, and possibly the lower pressures, black powder cartridges were not as badly affected by these mercuric primers.

Patents and trademarks are tedious to find and may not exist as many companies relied on secrecy for the protection of their formulas, especially prior to 1902. Even DuPont had not patented or trademarked quite a number of their IMR products before their exit from the business in 1986.³

L&R appears to have acquired some of their expertise, experience, and equipment for manufacturing and manipulating NC & NG at the Passaic works, before the acquisition of Leonard - American Smokeless. L&R's acquisition of interest in the Lake Superior Powder Company and in the manufacture of electric blasting caps in 1878, also gave them valuable experience with NC & NG.

Further Notes on Bullseye #1 and #2

An L&R Revolver Smokeless tin was acquired with a Bullseye label pasted on the back, in which a small quantity of powder remained, looking like small half-moons and crumbs, mixed with brown dust (deteriorated).

Another L&R Bullseye tin was acquired, (nearly full!) the contents of which are also little half-moons that if full round would measure about 0.06". This powder appears to be un-deteriorated, and has a lot number on the bottom of the tin (460?7). Since this tin seems to have a lot number on the bottom, unlike any of the other L&R tins, it is assumed that it was made after 1902, and acquisition by DuPont.

Enhanced Suspicion: Bullseye #1 may have been made with the same die as Infallible, but set to cut as fine as possible, not even giving full round cuts. The cuts are so thin that many of the granules are mangled into odd shapes. Bullseye #2, having been made with a smaller die and thicker with fully round cuts, for better consistency, probably after acquisition by DuPont, but before transfer to Hercules. Figures 1-4 below at 8X magnification.



Fig 1 L&R Revolver Smokeless with Bullseye label



Fig 2 L&R Bullseye (Bullseye #1)



Fig 3 Hercules Bullseye (1950s) (Bullseye #2)

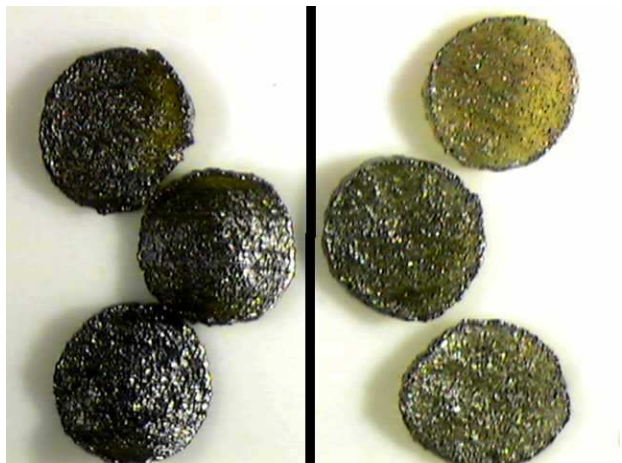


Fig 4 Hercules Infallible (1923) Unique (1950s)

The author is now convinced that Bullseye (#1 and #2) and Infallible were indeed identical in formulation, and that the differences between Bullseye #1 and #2 are merely the method of granulation.

Conclusions:

Laflin & Rand, from its inception by Matthew Laflin to the merger with Smith and Rand, to the acquisition by DuPont, was a company always concerned with producing a quality product. For a time, at least, Laflin & Rand was more forward looking than DuPont, in the acceptance of dynamite as a successor to black powder. Laflin & Rand was also among the first to be interested in smokeless powders, with the importation of the Troisdorf-Rottweil powders from Europe. Laflin & Rand saw possibilities in the “W-A” smokeless powders first produced by the Leonard and American Smokeless Powder Companies. Laflin & Rand were concerned enough with quality and safety that they delayed introducing their own smokeless powders despite the introduction of smokeless products by competitors.

When Laflin & Rand finally did begin to introduce their smokeless powders in 1896 and 1897, the powders they produced were first class products and were marketed as such. The advertising materials and packaging reflected pride and suggested that these were the best products that could be made. The longevity of the various products in the line, (W-A .30 – 32 years, Sharpshooter – 51 years, Lightning – 60 years, Infallible – Unique – 109 years, and Bullseye – also 109 years), through three company name changes are powerful evidence of their commitment to quality from the very outset. It is also clear that the commitment to quality was maintained by each of the successive companies, DuPont, Hercules, and Alliant.

Over the years, we have all seen many products come and go, and many changes to existing products in the name of “new and improved”. Many of these new and improved items are merely cheaper to produce and not an improvement at all. Today, we all know that change is often made merely for the sake of change. On that basis, the mere fact that Unique and Bullseye are still produced today is a testament to the near perfection of the original products, originated more than a century ago.

Since before the War for Independence, Americans have been known as shooters. Names like David Crockett, Daniel Boone, Bill Cody, Annie Oakley, Adam Bogardus, Ad & Elizabeth Topperwein, Alvin York, Carlos Hathcock, Bill Blankenship, and Lones Wigger are among the many, many names that come to mind. Be it hunting or target shooting or busting clays or military action, American marksmanship is an ingrained part of what it is to be American, maybe up there with Mom and apple pie. We are most fortunate, in the United States, that the shooting sports of all kinds, from target shooting to hunting, are open to everyone, and not merely the elite or the “landed gentry”, or the military, as it is in much of the rest of the world. It is a real pleasure and a privilege* to participate in an activity, the shooting sports, that has its roots at the very beginnings of our country, and, to realize that some of the products we use today have a history and a lineage that go back more than a century that we can actually touch and feel and even smell.

Except for the two minor changes in 1960 and 2001, Unique powder has remained unchanged from its introduction. Infallible remained unchanged throughout its canister production life. Bullseye has indeed remained unchanged from its inception. They must have done something very right indeed, 109 years ago to create these “classic” propellants. Unique, eh? And Infallible. And a Bullseye too.

** A privilege guaranteed us by the founding fathers in item two of our Bill of Rights.*

Curious anecdotal details (Appendix):

The Rands in Ingersoll-Rand (Rand Rock Drill Company) and Remington-Sperry-Rand are relatives of A.T. Rand from Laflin & Rand.¹

1908 Military (MR19)(Double Base) powder was made originally by DuPont and passed on to Hercules as HiVel#1. The HiVel line was apparently initiated by DuPont, not Hercules.^{2,3}

L&R seems to have preferred the double base powders, as did Hercules. DuPont seems to have preferred the single base powders. This may have been a simple choice of marketing (differentiation from the competition). It turns out that it is also less expensive to make NG than NC.⁴ Stabilizers were developed to help prevent powder deterioration and were added to nearly all powders beginning about 1910-1912.

In 1900, census reports said that there were 97 explosives firms operating in the United States, with assets valued at \$19.5 million, sales of approximately \$26.25 million, and employing approximately 5350 people.⁵

In 1904, dynamite accounted for 50% of DuPont's sales of 26.1 million dollars, black powder 30%, smokeless powder 15%, and other specialty blasting materials 5%.^{6,7} In 1906, DuPont's smokeless powder sales of \$3 million, of total sales of \$29 million, accounted for 20% of the company's profit.⁸

DuPont decided in 1971 to close their last black powder plant after March of 1973 because the government, a consumer of a significant portion of the plant's output, decided not to continue a contract for black powder. The Belin Works in Moosic, Pennsylvania was sold to Gearhart-Owens in 1973, which still makes black powder under the GOEX name. The plant was located less than 500 yards from the north end of the main north – south runway at the Wilkes-Barre Scranton International Airport, due to airport expansion over the years. This encroachment, environmental issues, and safety concerns made moving the production inevitable at some point, and a search for a new plant was begun probably before 1990. The move to the site of a former government munitions plant in Doyline, Louisiana was forced after a disastrous accident on April 17 of 1997, that permanently closed the Moosic plant.^{9, 10} Rail service was actually discontinued as a result of the plant closure.¹¹

DuPont was forced to move production of their IMR line of smokeless powders to the Valley Fields plant near Montreal, Canada in 1978 when an accident destroyed their Carney's Point plant, in New Jersey. DuPont elected not to rebuild the plant and finally sold their entire smokeless powder business to Exprotec, who owned the Valley Field plant, in 1986. This pretty much coincided with DuPont's departure from the production of all explosives and propellants. The IMR Company was created to handle the importation of the powders into the United States from Canada and the product packaging and marketing here. From 1986 until 2003, no new powders were introduced by IMR. This long period without innovation was costly to market share, and all the assets, including patents, trademarks, formulas, etc. were bought by the Hodgdon powder company in October of 2003. Exprotec and the Valley Field plant were sold to General Dynamics in 2006. In December of 1996 Olin spun off its powder making operations as Primex of St. Marks Florida. Primex was in turn bought by General Dynamics in 2001.¹² The Olin Powder Company was one of the very few that successfully resisted acquisition by DuPont in the early 1900s.

Some military cartridge boxes labeled as being loaded with Infallible contain powder that looks *exactly* like Bullseye. Powder manufacturers make many non-canister powders for ammunition companies and the military. These powders may look like other powders and may even be from the same formula as canister powders. Their performance may however be very different due to some special treatment or granulation.

World War One proved to be a catalyst in the diversification of DuPont's product lines, first, because of the need to find a use for the overcapacity of nitrocellulose plants (both before and after the war), and the need of dyestuffs that were no longer available from Germany.¹ This same overcapacity caused Hercules to diversify into naval stores and plastics.

The Repauno Chemical Company had been dumping toxic and valuable byproducts from the manufacture of nitroglycerin from 1880 to 1884. Unfortunately, some of this waste acid found its way into streams, causing the death of fish. Local fishermen filed a suit that was settled out of court.^{2,3} The recovery and re-use of these byproducts was one of Lamot du Pont's objectives from the outset, and would also be in part responsible for his untimely demise in March of 1884.^{4,5,6}

DuPont continued to print brochures with articles written by Dr. Walter G. Hudson for years after he died in 1920. Dr. Hudson was the first medical doctor DuPont hired to manage health issues in 1904 and organized their first formal medical division.⁷

DuPont's five smokeless powder plants in 1910 were: (DuPont)Carney's Point, (L&R) Haskell, (Schultze) Oakland, (International) Parlin, all in New Jersey; (CPW) San Francisco, California.⁸

It was decided that DuPont should keep the L&R smokeless powder plant at Haskell, NJ when it was forced to divest in 1912. This meant that for a time Hercules had no facilities to make smokeless powders at their Kenvil, NJ dynamite plant. So, until the Parlin nitrocellulose operations could be brought online and a smokeless powder line could be built at Kenvil, DuPont continued to produce the L&R powders for Hercules. It is therefore possible to find powder tins with the L&R logo with the Hercules name as manufacturer and a DuPont seal over the cap.

There may be some discrepancy in early dates due to differing sources.



Chemical tests:

Infallible (1923), C - 22.57% H - 2.48% N - 14.10% (39.15%) 1300+ cal/g

Unique (1950s), C - 22.27% H - 2.52% N - 14.65% (39.44%) 1300+ cal/g

Bullseye #2 (1950s), C - 22.45% H - 2.53% N - 14.53% (39.51%) 1300+ cal/g

Bullseye #1 (1898), C - 22.61% H - 2.67% N - 13.73% (39.01%) 1300+ cal/g

These results would indicate that all these products were made from the same formula, with the small variations caused by age and the differing lot numbers.⁹

Concurrent Developments in Cartridge Cases and Primers:

Center-fire cartridge cases for black powder made during the late 1800s were made with a design called folded head and later balloon head. These were inherently weak structural designs that were adequate for a limited number of firings with black powder at the moderate pressures that black powder could achieve. Both internally and externally primed cases were tried. The folded head type actually had a reinforcing cup inserted in the case to strengthen it. The balloon head case had the primer pocket intrude into the powder space, making the head thin and weak, but offered a bit more powder capacity. After 1900, the solid head case design was adopted, which was much more able to withstand the three-fold pressures created by smokeless powders in the newer more powerful cartridges.

The original primer caps created to fire in muzzle loading weapons used a fulminate of mercury mixture to ignite the black powder charges. Very similar primer caps were created to ignite the black powder in the new center-fire cartridge firearms that became available during the Civil War. An Englishman designed the “Boxer” primer that became popular in the United States, and an American designed the “Berdan” primer that became popular in Europe. The mercury in these primers seems to have been largely “captured” by the large quantity of fouling created by black powder. When used with smokeless powder, with its much reduced fouling and higher pressures, case life was dramatically reduced because the brass was made brittle by the mercury. Of course, we know today that the mercury is also quite toxic. Fulminate of mercury primers were essentially discontinued by all makers by 1898.¹ A new priming mixture was developed using potassium chlorate and lead azide. These primers worked well and did not harm the brass if it was properly washed after use. The residue from these primers was, however, a very hygroscopic potassium salt that was very corrosive to gun barrels. It was during the Second World War that non-corrosive mixtures were developed. Even so, corrosive primers continued to be made by some manufacturers into the 1960s.

We make an important distinction today between explosives and propellants. This distinction is particularly important to the transportation and storage of these materials. Of course, all these materials burn with various degrees of speed and ferocity. This speed of burning and ease of ignition is what separates the two. Both also contain their own oxygen supply, meaning that once ignited, they cannot be readily extinguished, if at all. Modern explosives also require a special kind of ignition to cause them to detonate explosively. When smokeless powders are handled with the intended proper care, and in the normally small quantities, danger is minimized.

Old fashioned black powder is classified as an explosive on account of its quick burning nature and ease of ignition, even though it contains much less energy than an equal weight of smokeless powder. Smokeless powders are considered propellants because they burn in a more controlled way.

As an energy comparison, an ounce of gasoline contains considerably more energy than an ounce of smokeless powder. If merely ignited in open air, both will burn, but the smokeless powder will burn much faster. Contained in an engine, the gasoline will run the engine for a time, and an ounce of powder will propel 20 or more charges from a shotgun. As a volatile liquid, gasoline is considered by many to be far more hazardous than smokeless powder. Even an ordinary 0.9 ounce charcoal briquette contains more energy than an ounce of smokeless powder. Of course it burns much slower yet, and is easily extinguished.



Lasting Impressions:

The three things that impressed me most in this investigation were the dedication of the people who produced these products; the advertising materials they created and the mindset behind those materials; and, of course, the fact that some of these powders are still manufactured today, nearly 110 years after their creation.

End Notes:

Images:

Front inside cover from the author's collection (1902 brochure cover with logo)

Back inside cover courtesy of Ted Bacyk, Gunpowder Cans & Kegs by Bacyk & Rowe p240. (elegant lady hunting with dog)

Table of Contents 1898 brochure cover courtesy of the Hagley Museum & Library

Page 6 (3) DuPont black powder label images courtesy of the Hagley Museum & Library

Page 7 from a 1920 Hercules advertisement from the author's collection

Page 8 L&R "flag in wreath" logo from the author's collection

Page 10 45-70 and 30-40 Krag cartridge images by the author

Page 11 W-A Smokeless formulas and envelope courtesy of the Hagley Museum & Library

Page 13 1996 Alliant Reloader's Guide

Pages 14 – 15 images courtesy of the Hagley Museum & Library

Pages 16-18 from the author's collection and the Hagley Museum & Library

Pages 19 – 24 images courtesy of the Hagley Museum & Library

Pages 25 Images courtesy of Joyce & Pat McKune of Sporting Collectables 1802 Calendar

Page 26 Oil painting by Phillip R. Goodwin image courtesy of the Hagley Museum & Library
Accession # 1954.1.523

Page 27 1915 Hercules poster of lady in blue dress courtesy of Joyce & Pat McKune of Sporting Collectables, calendars courtesy of the Hagley Museum & Library, poster courtesy of the Alliant Powder Company

Page 28 shot with Infallible counter cards (sketches of elegant lady) courtesy of the Hagley Museum & Library

Page 31 counter card backs from the author's collection and the Hagley Museum & Library

Page 34 – 36 advertisements from the author's collection

Page 39 stock certificate courtesy of the Hagley Museum & Library

Pages 40 – 41 images from various sources including the authors collection, the Hagley Museum & Library and Gunpowder Cans & Kegs by Bacyk & Rowe

Page 42 from the author's collection

Page 43 powder images by the author

Page 45 black powder label images (5) courtesy of the Hagley Museum & Library

Page 47 powder images (4) microscopy by Karen Miles

Page 50 shotgun shell images by the author

Page 52 L&R page of stickers image courtesy of the Hagley Museum & Library

Page 60 1925 advertisement from the author's collection

Page 61 L&R logo from letterhead (New York office, 1905)

Page 64 1898 brochure images courtesy of the Hagley Museum & Library

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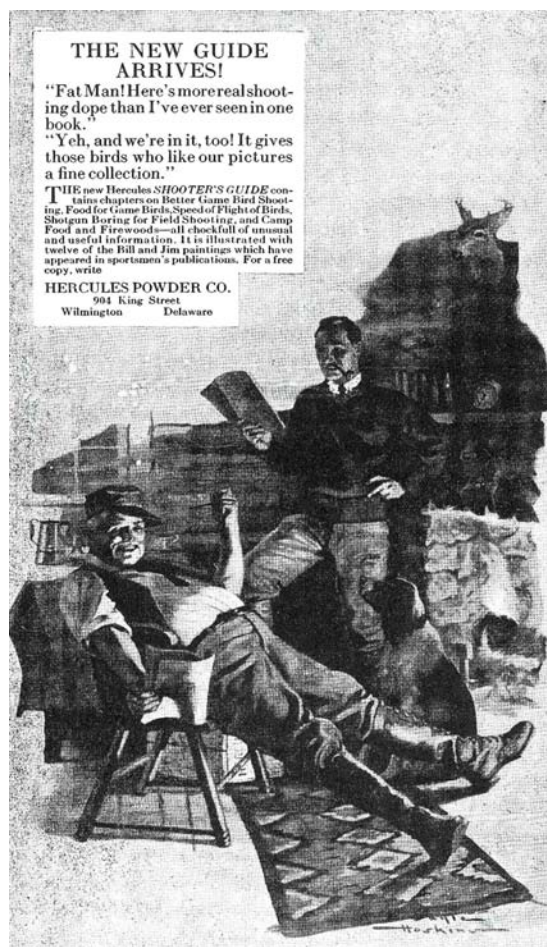
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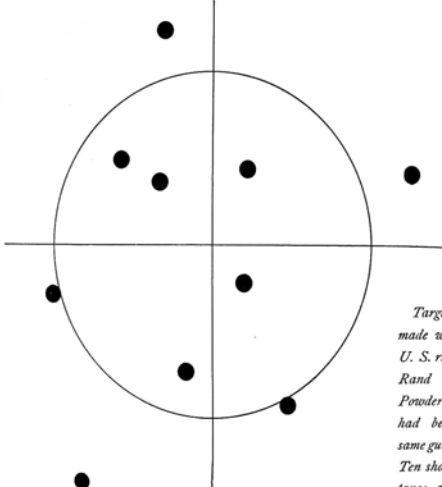


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